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ABSTRACT

This guide, based on the Texas Education Agency's "essential elements," presents a model for providing differentiated instruction for gifted high school students in any area of content and within any educational setting. The guide provides strategies for changing the following dimensions of the curriculum: (1) content or subject matter, (2) processes or thinking skills, (3) products or outcomes of learning, and (4) independent study skills. Emphasis is on using the "essential elements" as the foundation of learning while differentiating to meet the academic needs of gifted students. The curriculum development model used is illustrated. After an introductory section, Section 1 focuses on content differentiation with practice templates for developing instructional objectives and a variety of worksheets to help teachers plan for content differentiation. Section 2 provides similar templates and worksheets for the area of process differentiation, including strategies for development of creative thinking, critical thinking, and creative problem solving. Product differentiation is the subject of Section 3, with suggested strategies for such goals as encouraging multiple modes of expression, guiding self-selection, and supporting continuous progress. Section 4 is on developing independent study skills and is organized around seven suggested stages of independent study. The final section provides sample units of study and lesson plans. Contains 58 references. (DB)

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CURRICULUM GUIDE FOR THE EDUCATION OF GIFTED HIGH SCHOOL STUDENTS

SECOND PRINTING, 1993

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INTRODUCTORY SECTION

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Suggestions regarding corrections, modifications, additions, and deletions should be sent to the authors through the TAGT office.

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Classroom teachers, program coordinators, and administrators were asked to participate in the revision process after the first draft was presented to the 1990-1991 TAGT Officers. Two-day institutes were planned and conducted in Austin, Fort Worth, Houston, and McAllen and the participants were invited to offer suggestions for the modification of this document. The present version of the guidebook includes input from many individuals from throughout Texas.

The third working draft of this document was submitted to the 1991-1992 TAGT Officers for final approval and distribution. It is the intent of the authors that the document be continually revised and improved in order to provide teachers in Texas with a useful guide for meeting the needs of gifted students. It is also the hope of the authors that this document will be used by high school teachers in schools from other states and that they, too, will add to the ongoing improvement of this guide. Many thanks to all of the individuals who made valuable contributions to this effort.

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Georgia Department of Education

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INTRODUCTION: HOW TO USE THIS GUIDEBOOK

Curriculum Guide for the Education of Gifted High School Students is designed for all educators responsible for providing instructional services to academically gifted and talented students. The model offered within this guide is designed to be used with any area of content and within any educational environment. The guide requires that teachers using the model have requisite experience in working with the Texas Education Agency's essential elements. Individuals lacking information regarding the essential elements as well as background information in the specific discipline being taught may encounter some difficulty in applying the model of differentiation.

The model used in the guide does not "tell" teachers what to teach to gifted students. Rather, it provides a tool for adapting the regular curriculum so that the learning experiences in the classroom "fit" or "match" the traits and the needs of the gifted learner. Educators using this guide are encouraged to use the information presented (as well as other sources of information, including personal experience) to develop activities that will respond to individual students and local needs. As an educator, you are encouraged to use this document as:

- a means for solidifying your own personal and professional beliefs about education in general and about education for gifted learners in particular. There are a number of opinions offered in this guidebook. You are invited to agree, disagree, or withhold judgment;
- a means for identifying that which you already do well. Many teachers do provide appropriate modifications of the regular curriculum for gifted students but are unclear as to exactly why their efforts are "correct";
- a means for talking with gifted students about curriculum and about the need to modify learning experiences for them;
- a point of discussion with colleagues in the same department as well as with colleagues from other departments;
- a planning tool for modifying specific dimensions of curriculum for gifted students in your classes;
- a "map" to determine which direction(s) you would like to travel in terms of your own search for information on curriculum and instruction.

There is no such thing as "mastering" the field of gifted child education. Teachers of the gifted are individuals intent on learning ways to adapt and develop appropriately matched curricula for gifted learners.

PROGRAM PHILOSOPHY

"Differentiation" is one name for the process of modifying learning experiences so that they "match" the needs and nature of the learners. As applied to the education of gifted students, differentiation is a method for re-aligning curricula in order to assist the gifted learners to convert their potential into performance.

There are several dimensions of curriculum that can be modified. These include (1) the content, or subject matter; (2) the processes, or thinking skills; (3) the products, or outcomes of learning; and (4) the independent study skills. Within this guide, strategies will be presented for changing each of these dimensions of curriculum.

The recommendations within this guidebook are based on the following assumptions regarding the education of gifted and talented students:

- The education of gifted students is part of each school district's commitment to provide quality services to all students.
- Gifted students need to (a) master required content, (b) learn basic skills, (c) present ideas through traditional product forms, and (d) understand how to access and organize information. However, mastery of the required curriculum is not sufficient for the development of gifts and talents.
- Gifted students may be gifted in one content area and not gifted in other areas.
- Gifted students can be gifted *and* be culturally diverse, have a handicapping condition, be economically deprived, and/or have a behavior problem. These conditions should not be viewed as deficits but rather as indicators of individual differences within the population of gifted students.
- Curriculum for gifted students should be developed based on a clear understanding of the characteristics that distinguish gifted students from their age peers (for whom the regular curriculum is planned).

Each teacher should take time to list the strong philosophical beliefs that he/she holds regarding the nature and the needs of the gifted learner. These beliefs will influence the ways in which the teacher will respond to this publication and to gifted students.

PURPOSE OF PROGRAMS FOR GIFTED STUDENTS

The purpose of programs for gifted students is to identify and to nurture their abilities, thereby assisting these students to translate gifts of "potential" into productive performances that are commensurate with their abilities. Curriculum is the vehicle for the development of potential.

For curriculum to be an effective vehicle of talent development, it must be well-organized, sequential, and coordinated with the required mastery of basic skills and information. Isolated learning experiences which serve only to entertain or "enrich" gifted learners may be counter-productive to good programming practices. In isolation, such activities usually lack an origin and a destination. Consequently, gifted learners are the recipients of learning experiences that lack substance and academic rigor.

There is a common misconception in the field that a "topic" or a "thinking skill" may serve as the focal point of differentiation for gifted learners. Consequently, units on "Greek mythology" and on "thinking creatively" too frequently serve as the foundation of programs for gifted learners. Education should provide all students with opportunities to know about mythology and to think creatively. There is absolutely nothing about the study of mythology or the use of abstract thinking skills that "belongs" to education for gifted students. At best, the study of topics and abstract thinking skills can only serve as a medium for differentiation and should never be the focus of differentiation.

There is another misconception in the field and it is that the regular curriculum is "inappropriate" for gifted learners. This is not so. Gifted students, as all students, need to learn and must master the content and the skills deemed necessary by a society for a person to be good "participants" in that society. However, it is also true that the regular curriculum may be "insufficient" to enable gifted students to develop their potentials. In general, the regular curriculum focuses on learning what is already known, not on generating new ideas, assessing long-held assumptions, and solving complex problems.

Some educators have mistakenly asserted that programs for gifted students are "elitist" in nature. This assertion, while incorrect, may be voiced by some educators when programs seem to provide learning experiences that are "privileged" forms of entertainment and enrichment rather than curricula that are appropriately challenging to the academically gifted learners. High school athletic programs provide rigorous opportunities for students with high potential to develop kinesthetic skills. Similarly, programs for identified gifted students should provide rigorous opportunities for the development of academic and intellectual skills. There should be a clear "match" between the traits/needs of students and the educational opportunities provided in the curriculum.

CURRICULUM MODEL

The model used in this guide presents the dimensions of curriculum as they are used in planning and implementing learning experiences. This model will be used to:

- assist educators in assessing existing curricular practices used in providing appropriate learning experiences for learners within a district;
- demonstrate ways in which the basic knowledge and skills delineated in the essential elements may be used as the foundation for providing learning experiences for gifted students;
- organize a procedure through which the dimensions of curriculum (i.e., content, process, product, and independent study skills) may be modified to increase the "fit" or "match" with the needs of gifted students;
- provide a structure to assist educators in generating curriculum in areas where there are gaps in information or materials.

Content Dimension of Curriculum

The content dimension of curriculum focuses on the information that is included within learning experiences. Content may be divided into two parts: "simple" (or required) and "complex." Simple content includes the facts, details, rules, and concepts that relate to the topic of study. Complex content includes the issues, problems, and themes related to a topic of study (or that cut across various topic areas or across various disciplines).

Section I of this guidebook provides additional information regarding the content dimension of curriculum and specifies strategies for differentiating content for gifted and talented students. Examples are provided that use the essential elements as the foundation for differentiation.

Process Dimension of Curriculum

The process dimension of curriculum includes two domains: the cognitive domain and the affective domain. The cognitive domain focuses on thinking skills and the affective domain focuses on feelings, beliefs, perceptions, and attitudes. The cognitive domain may be divided into two sections: basic and abstract. Basic cognitive processes include the mental skills of recalling, understanding, and using information. Abstract cognitive processes include the mental skills of creative thinking, critical thinking, and problem solving.

The purposes of basic cognitive thinking skills include (1) becoming a good "consumer" of information, (2) mastering that which is already known, and (3) learning information which may be manipulated through abstract thinking skills. The purposes of abstract thinking skills include (1) becoming a

good producer of information, (2) becoming a good decision maker, and (3) becoming a good problem solver.

The affective domain, according to Krathwohl, Bloom, and Masia (1964), includes the levels of receiving, responding, valuing, organization, and characterization. Each level is divided into component parts. The purposes of the affective domain include (1) assessing students' level of interaction with content, (2) reinforcing content through activities that have personal meaning to students, and (3) responding to the affective needs of students.

Section II of this guidebook provides information regarding process education and specifies strategies for using abstract thinking skills with gifted students. The three areas of focus are (1) creative thinking, (2) critical thinking, and (3) problem solving. Sample objectives are offered which combine elements of the essential elements with specific skills of abstract thinking.

Product Dimension of Curriculum

The product dimension of curriculum includes the tangible and intangible means through which students demonstrate what they have learned. Products may be classified in terms of kinesthetic, verbal, visual, and written forms.

The purposes of product forms are to (1) accommodate various learning styles and learning preferences, (2) provide suitable and adequate forms for the presentation of complex information and/or productive thinking, and (3) individualize instruction.

Section III of this guidebook provides information regarding the product dimension of curriculum as well as strategies for using product differentiation with gifted students.

Independent Study Skills Dimension of Curriculum

Independent study skills allow students to pursue and understand knowledge--alone and with other people. Independent study skills assist students in pursuing the acquisition and the discovery of information with varying degrees of "independence" from direct instruction. Stages of independent study may include selecting a topic, stating a challenge, selecting a design, gathering information, organizing information, and reporting findings.

The purposes of independent study skills include (1) increasing the level of personal autonomy, (2) facilitation of independent work, and (3) the production of new information.

Section IV of this guidebook provides information regarding independent study skills. Implementation strategies for an independent study program are discussed in this section.

Objectives for Learning Experiences:

Educators use objectives to describe the interaction of the dimensions of curriculum within a learning activity. Each objective includes the content, the process, the product, and the independent study skill that will be included within the learning activity (The independent study skill dimension may be omitted in some cases.) For example, an objective might be written as follows:

In their study of (content), the students will use (independent study skill) in order to (process) and will demonstrate what they have learned through a (product).

As written, this objective is only a template. The educator must add the specific dimensions in order for it to have meaning. The template might be completed in the following way:

Example
In their study of Texas history, students will interview residents in their community in order to identify and understand key issues of concern to voters and will present their findings through a chart and a written report.

Of course, educators could insert any element of content, any thinking skill, any product form, and any independent study skill into the template.

Frequently, educators are given the dimensions of curriculum that are to be taught. The information may be provided through a document from a state department of education, from a textbook company, from the local school board, or from some other source. In such cases, the teachers teach the dimensions of curriculum that have been "prescribed" by someone else. However, even when the curriculum is prescribed, the teachers must "tailor" the learning experiences within the curriculum in order to accommodate the needs of students. By identifying the dimensions of curriculum through templates for objectives, the options available for differentiation may be examined.

The dimensions of curriculum may be "moved around" and also reconstructed within an objective. The objective template might follow any number of patterns:

Example:
Pattern: content - independent study skill - product - process

Template: In their study of (content), the students will use (independent study skill) to develop a (product) to demonstrate their ability to (process)

Objective: In their study of the economy of Texas, students will use primary and secondary sources to develop a map identifying key agricultural and industrial areas of the State.

Example:
Pattern: product - independent study skill - process - content

Template: The students will develop a (product) using (independent study skill) in order to (process) in their study of (content).

Objective: The students will develop a written report, collecting information through the school library and state agencies, explaining the expansion of industry in their study of changes in the State's economic growth since 1950.

Educators must determine the "order" in which the dimensions of curriculum should be listed within the objective. Considerations for making this decision include:

- the order of importance of the dimensions; usually, the most important dimension is listed first;
- whether or not the objective is to include an expected level of achievement within it, in which case the product dimension is usually listed last;
- the clarity of the objective for the reader.

Regardless of the pattern selected, it is essential that the dimensions are compatible with one another. This will be discussed later in this guide. The following practice templates may be used to construct an objectives.

In their study of _____, the students will use

_____ in order to _____

_____and will present their ideas through a

_____ or a _____.

By developing a _____, the students will

_____ after

checking _____ in their study of

_____.

THE ESSENTIAL ELEMENTS

In July of 1988, a revised version of the State Board of Education Rules for Curriculum was distributed to educators in Texas. The rules provide the essential elements and program requirements for school districts to include in services to students. These essential elements may also be used as the basis for writing and differentiating learning objectives for gifted students. The *numeral* of the essential element may be placed in the content "slot" of the objective and the *capital letter* of the essential element may be placed in the process "slot" of the objective. The teacher may select whatever product forms and independent study skills appropriate for the activity.

Template: In their study of (content), the students will (process) and demonstrate what they have learned through a (product).

Literature Objective: (essential element 3-B, p. 100)
In their study of *literary concepts and skills*, the students will *distinguish between language used denotatively and connotatively in literary selections* and will demonstrate what they have learned through a written report.

Mathematics Objective: (essential element 3-A, p. 149)
In their study of the *different types of probability distributions*, the students will *construct and interpret frequency distributions* and will demonstrate what they have learned through a visual graph with a written explanation.

Science Objective: (essential element 5-A, p. 158)
In their study of concepts of *measurement using relationships to standards*, the students will be able to *measure physical quantities* and will demonstrate what they have learned by plotting data on graphs.

Social Studies Objective: (essential element 1-B, p. 198)
In their study of the *history and contributions of selected cultural, racial, and ethnic groups,* the students will be able to *explain the multicultural nature of discovery, exploration, and settlement of the United States* and will demonstrate what they have learned through a written or oral report.

Chapter 75, subchapter A. General Provisions, 75.4, "Special Populations and Programs," specifies that "school district programs for students identified as having special needs shall modify the method of instruction, pacing, or materials, as appropriate to provide full opportunity for learning the essential elements" (p. 4). Gifted and talented students are included as a "special population" under Chapter 89, subchapter C.

This document is designed (a) to demonstrate ways in which the essential elements may be used as a foundation of learning for gifted students and (b) to explain ways in which the essential elements may be differentiated in order to meet the academic needs of gifted students.

FOUNDATION OF DIFFERENTIATION

The Gifted Learner

In order to modify the regular curriculum (as specified in the essential elements), it is necessary to understand the characteristics and the needs of gifted learners. To the degree that the characteristics of gifted learners distinguish them from their age peers, to that same degree the regular curriculum must be adapted. The following is a list of general characteristics of gifted students.

As compared to their age peers, gifted students tend to:

a. learn more rapidly
b. have a stronger need to know
c. be more adept at using abstract thinking skills
d. demonstrate more sophisticated communication skills
e. have a longer attention span
f. perceive more unusual and remote associations
g. see and create patterns of meaning
h. have intense and/or broad interests
i. be more intellectually playful
j. be better at discerning discrepancies
k. have greater retention of information
l. be more imaginative.

Listing characteristics of gifted learners can be misleading as the characteristics are interactive and dynamic, not singular and static. Hence, curriculum for gifted learners must be interactive and dynamic. Based on the general *characteristics* of gifted students, generalizations regarding the *needs* of the learner may be listed. These generalizations may then be used to formulate "principles" of differentiation that may be used to plan, direct, and assess the modification of curricula. The following chart may be used to examine this procedure:

Characteristics:	Needs:	Actions:

Principles of Differentiation

The National/State Leadership Training Institute on the Gifted and the Talented Curriculum Committee presented the following list of "principles of differentiation" to assist educators in modifying and developing curricula for gifted learners. The list has been adopted by the Texas Education Agency for use in assisting districts in providing programs for gifted learners.

1. Present content that is related to broad-based issues, themes, or problems.
2. Integrate multiple disciplines into the area of study.
3. Present comprehensive, related, and mutually reinforcing experiences within an area of study.
4. Allow for the in-depth learning of a self-selected topic within the area of study.
5. Develop independent or self-directed study skills.
6. Develop productive, complex, abstract, and/or higher level thinking skills.
7. Focus on open-ended task.
8. Develop research skills and methods.
9. Integrate basic skills and higher level thinking skills into the curriculum.
10. Encourage the development of products that challenge existing ideas and produce "new" ideas.
11. Encourage the development of products that use new techniques, materials, and forms.
12. Encourage the development of self-understanding, i.e., recognizing and using one's abilities, becoming self-directed, appreciating likenesses and differences between oneself and others.
13. Evaluating student outcomes by using appropriate and specific criteria through self-appraisal, criterion referenced and/or standardized instruments.

National/State Leadership Training Institute on the Gifted and the Talented Curriculum Committee (1979): James J. Gallagher, Sandra N. Kaplan, A. Harry Passow, Joseph S. Renzulli, Irving S. Sato, Dorothy A. Sisk, and Janice Wickless.

These principles of differentiation may be used to develop a list of "guidelines for differentiation" that are classified in terms of the four dimensions of curriculum: content, process, product, and independent thinking skills. These guidelines may also be translated into program goals.

Guidelines for Differentiation

Educators working with gifted and talented students may wish to develop guideline statements that relate to the specific dimensions of curriculum. The following are examples of such statements.

Content

1. Content differentiation should include the modification of the rate of learning, including the point at which students are allowed to begin their study, the rate at which they are allowed to learn, and the point at which they are allowed to leave an area of study.

2. Content differentiation should include opportunities for student-selected areas of study within and across the disciplines.

3. Content differentiation should include (a) the modification of the complexity in the area of study so that it includes issues, problems, and themes and (b) a multidisciplinary approach to learning.

Process

1. Process differentiation should include the learning and usage of abstract thinking skills, including creative thinking, critical thinking, and problem solving.

2. Process differentiation should include the application of abstract thinking skills to complex content, resulting in the production of sophisticated products.

3. Process differentiation should include the integration of basic skills and abstract thinking skills.

Product

1. Product differentiation should include the learning and usage of multiple and sophisticated forms of communication.

2. Product differentiation should include the opportunity to present information to diverse and appropriate audiences.

3. Product differentiation should include the opportunity for students to participate in the assessment of learning activities and the resulting product forms.

Independent Study Skills

1. Independent study skills differentiation should include both the learning and the usage of self-directed, independent study skills.

2. Independent study skills differentiation should include the in-depth application of independent study skills to areas of concern and interest to students.

3. Independent study skills differentiation should include the learning of specialized skills that are the "tools of the trade" in specific areas of human endeavor.

(Adapted, National/State Leadership Training Institute on the Gifted and the Talented, 1977, 1979, and 1981)

These guidelines may be used for the modification of the required curriculum. Specific strategies are presented within the following sections of this guidebook for using these principles with the dimensions of content, process, product, and independent study skills.

On the following page is a depiction of the curriculum development model that is used in this guidebook. The four dimensions of curriculum (content, process, product, and independent study skills) are specified, as well as component parts of each of the dimensions. On page 18, there is a depiction of the model divided into four quadrants. The concept of using quadrants will be explained in detail in the fifth section of the publication. At this point, the following explanation may be sufficient.

- Quadrant one represents the required content by basic thinking skills.

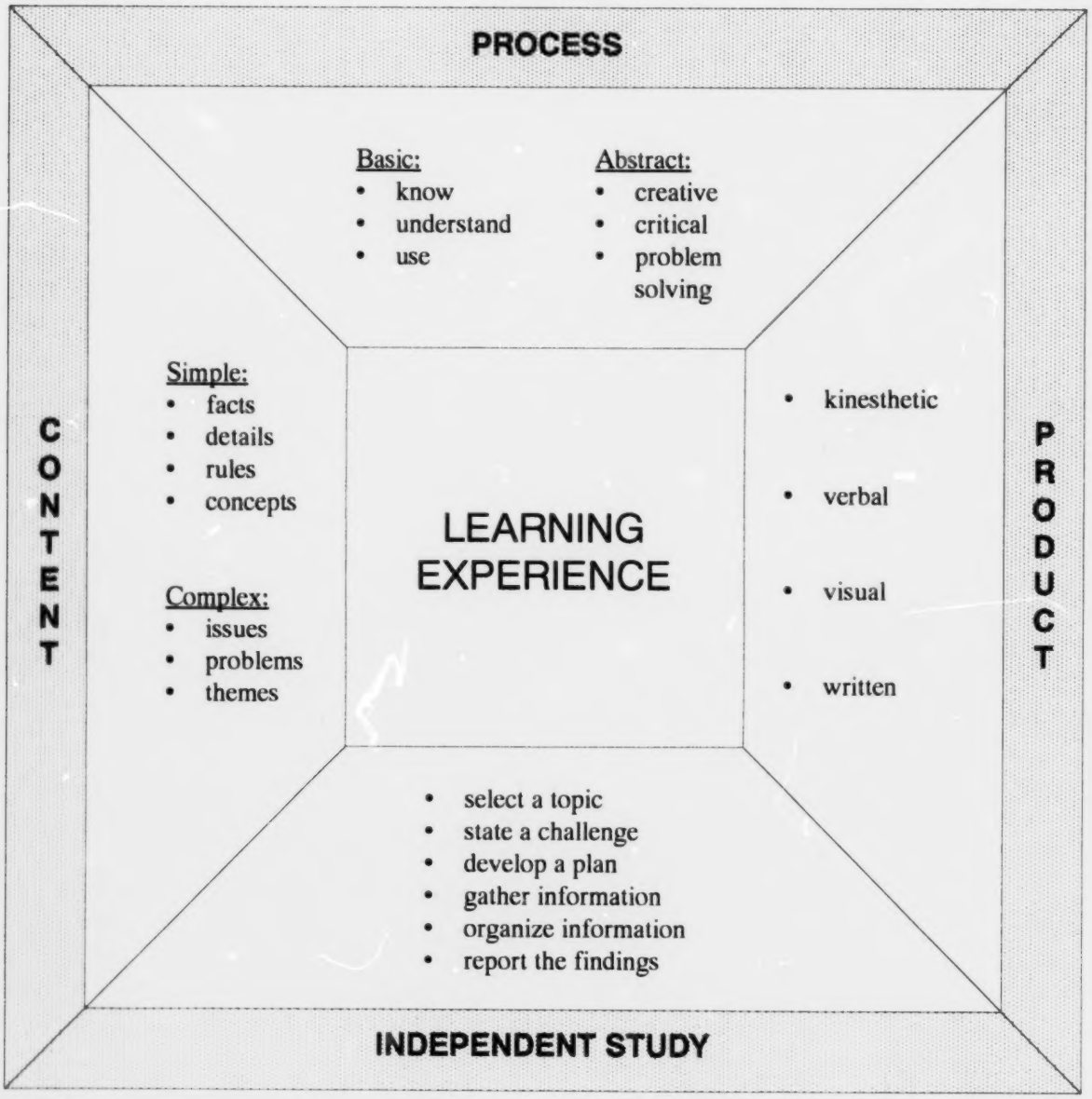
- Quadrant two represents the required content by abstract thinking skills.

- Quadrant three represents complex content by basic thinking skills.

- Quadrant four represents complex content by abstract thinking skills.

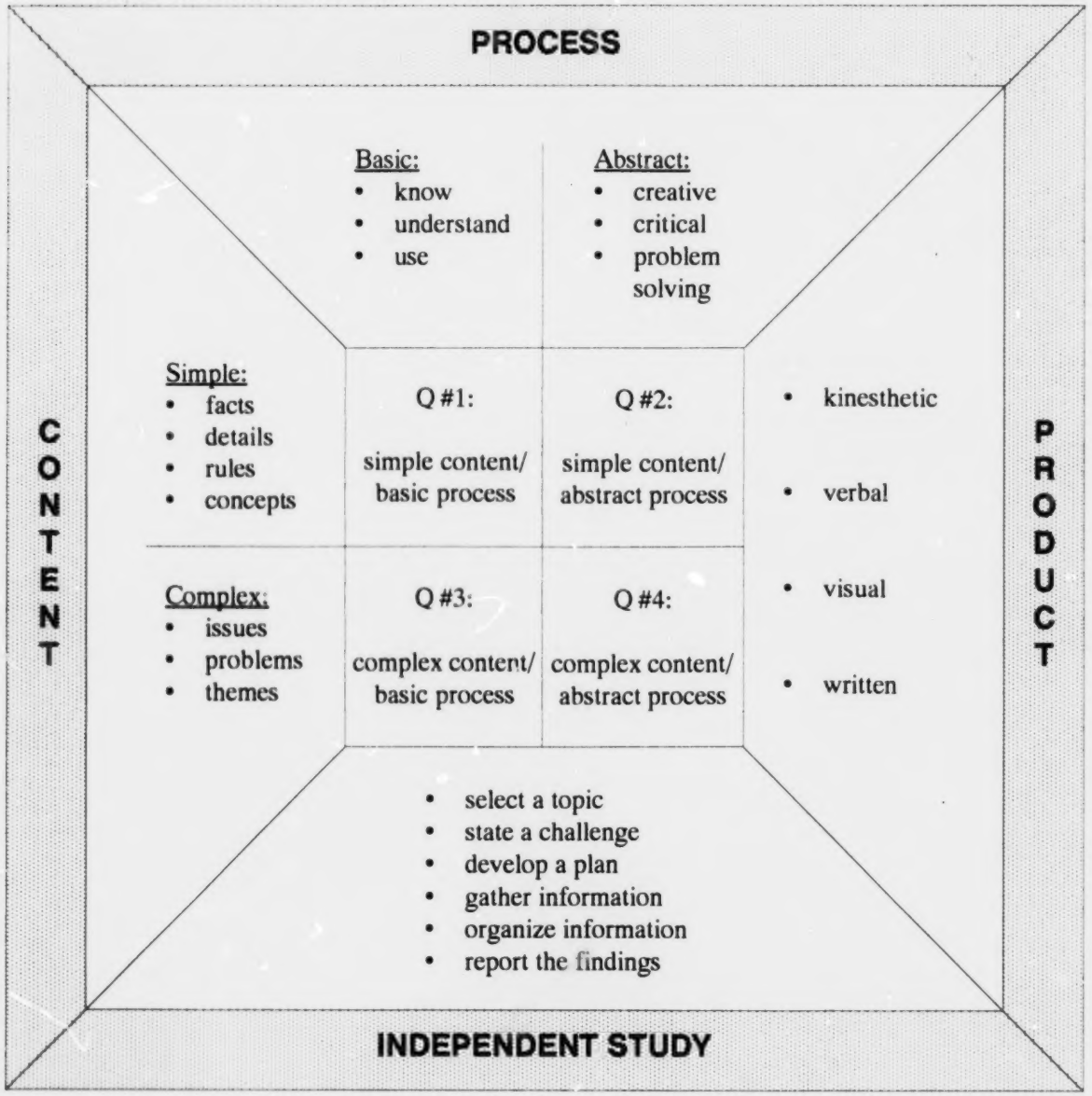
This structure was used to develop the sample model units of study and the lesson plans in Section V of this guidebook. Sample units are offered in the content areas of literature, mathematics, science, and social studies. In addition, a multidisciplinary unit is provided that focuses on the theme of "order." Sections I, II, III, and IV of this guide present strategies for constructing or modifying units of study using this model.

CURRICULUM DEVELOPMENT MODEL



CURRICULUM DEVELOPMENT MODEL

(incorporating quadrants)



TEXAS STATE PLAN

The Texas State Plan and Guidelines for the Education of the Gifted/Talented (1990) provides educators with information on how to differentiate curricula for gifted learners.

Principle I: The curriculum for gifted/talented students is based on a strong theoretical foundation and is differentiated from the regular core curriculum.

Criteria:

1.1 Curriculum for the gifted is based on the characteristics and needs of gifted students.

1.2 Release time and resources are provided for curriculum development, and time is provided for regular classroom teachers and teachers of the gifted to coordinate instruction.

1.3 Curriculum for the gifted extends, reinforces, and/or replaces the regular curriculum, though care must be taken to assure that gifted students have mastered the essential elements included in the core curriculum.

1.4 The program goals and student objectives are differentiated for gifted learners and will produce measurable outcomes.

1.5 Curriculum has a districtwide scope and sequence (K-12) for the content to be studied, the processes to be mastered, and the products to be generated.

Principle II: Curriculum for gifted/talented students includes provisions for differentiation of content.

Criteria:

2.1 Content is differentiated by encouraging students to move beyond merely factual information toward broader concepts and generalizations.

2.2 Differentiated content is achieved vertically by acceleration of knowledge and/or skills that correlate with the student's mental rather than chronological age, complement the student's interests, and/or satisfy the student's quest for advanced or complex information.

2.3 Differentiated content is achieved horizontally by providing for in-depth expansion of student knowledge.

2.4 Differentiated content is achieved by relating what is learned in one area of study to other areas and by crossing the boundaries of different disciplines to promote the application and transfer of learning.

2.5 Differentiated content is achieved by using multi-level resources that are varied and that are beyond those reserved or designated for the regular curriculum.

2.6 Differentiated content is achieved by allowing and encouraging students to pursue areas of interest in selected disciplines.

Principle III: Curriculum for gifted/talented students includes provisions for differentiation of process.

Criteria:

3.1 Processes are differentiated by extending opportunities for students to develop critical thinking.

3.2 Processes are differentiated by extending training for students in creative and productive thinking.

3.3 Processes are differentiated by empowering students to conduct more extensive guided and independent research.

Principle IV: Curriculum for gifted/talented students includes provisions for differentiation of products.

Criteria:

4.1 Students develop complex products that provide evidence of the differentiated content and processes that have been acquired.

4.2 Students develop products that are often audience-targeted.

4.3 Students develop expertise in using new experiences, resources, and technology not ordinarily used in product development.

4.4 Students are encouraged to select the types of products they produce through analysis of their needs and interests.

4.5 Students develop skills necessary for assessing their own performance/products and those of their peers using student and/or teacher designed criteria.

4.6 Students learn to accept and use critical feedback in a productive manner.

Principle V: Curriculum for gifted/talented students includes provisions for affective growth.

Criteria:

5.1 Differentiated curriculum ensures the development of insights into one's strengths, weaknesses, interests, learning styles, and preferences.

5.2 Differentiated curriculum ensures understanding of the student's responsibilities in a complex and diverse society and as a gifted/talented individual.

5.3 Differentiated curriculum ensures opportunities for career and leadership assessment and training as well as appropriate followership roles.

5.4 Differentiated curriculum ensures opportunities to investigate the relationship between oneself and others.

Principle VI: The learning environment supports and enhances the differentiated curriculum for gifted learners.

Criteria:

6.1 The learning environment nurtures the cognitive and affective development of gifted students.

6.2 Learning resources are both cost effective and consistent with the program goals and student objectives.

6.3 Materials and resources are differentiated in use or kind from those used in other options including general education, honors courses, and/or Advanced Placement courses.

6.4 District guidelines for evaluation of materials and resources for the gifted are established and used in selecting those appropriate for differentiated learning.

The Texas State Plan and Guidelines for the Education of the Gifted/Talented (1990), Texas Education Agency, Austin, Texas.

Notes:

SECTION I:

CONTENT DIFFERENTIATION

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STRATEGIES FOR CONTENT DIFFERENTIATION

The strategies for content differentiation are tied to the characteristics of the gifted learners, including their propensities toward (1) learning rapidly, (2) having better retention of information, (3) making remote associations, (4) manipulating abstract symbol systems, and (5) having an interest in issues, problems, and significant ideas.

Guidelines of Content Differentiation

A comprehensive program for academically gifted and talented students should include the modification of the content dimension of curriculum. The following guidelines may be used in conjunction with the N/S-LTI-G/T "Principles of Differentiation" (1979) when planning learning experiences and programs of study for gifted learners.

1. Content differentiation should include the modification of the rate of learning, including the point at which students are allowed to begin study, the pace at which they are allowed to learn, and the point at which they are allowed to leave an area of study.

2. Content differentiation should include opportunities for student-selected areas of study within and across the disciplines. These independent study opportunities should be supported through direct instruction in skills of academic pursuit.

3. Content differentiation should include the modification of the complexity of areas of study to include (a) integrated units of study, (b) multidisciplinary units of study, and (c) interdisciplinary units of study. The subject matter should include debatable issues, solvable problems, and universal themes.

The first guideline may be applied to the essential elements through specific strategies which include (1) pre-testing for content mastery, (2) "compacting" of information, (3) acceleration of the rate of learning, and (4) modification of the "exit" point.

The second guideline may be applied through the application of independent study skills to a self-selected area of study. Section III of this guidebook will present strategies for assisting students to learn and use skills for independent study.

The third guideline of differentiation may be implemented through increasing the complexity of the content. Complexity may include extension of content to the study of issues that are debatable, problems that may be solvable, and themes that focus on learning "big ideas." The emphasis within this guidebook is on how the application of the third guideline of content differentiation may be utilized for the purpose of modifying and planning curriculum for gifted learners.

CONTENT STRATEGY #1: ISSUES

A topic within an area of study may be extended to issue-based content when there is "controversy" within the topic. The controversy must provide a genuinely debatable, and not necessarily solvable, issue. Students should have mastery of sufficient information so that the issue is considered objectively. For example, students should not be asked to debate issues regarding space exploration if they do not possess requisite information regarding this area. Students should also have knowledge of and experience in using skills of critical thinking prior to engaging in issue-based curricula.

Literature Objective
In their study of Romantic Era prose and poetry, the students will be able to use what they have learned to debate the issue of "What should be the balance between the 'natural order' and the 'economic order' in a technological society?" and will present their positions in an editorial, a speech, a poem, or a self-selected product.

Mathematics Objective
In their study of probability and statistics, the students will be able to use what they have learned to assess the issue of "Who should be responsible for establishing levels of confidence regarding safety standards effecting transportation?" and will present their positions through a written proposal, a speech, a poster, or a self-selected product.

Science Objective
In their study of physics, the students will be able to use what they have learned to affirm or dispute the proposition that the federal government should support the development of tidal electric generators as an energy source and will present their positions on this issue in a class discussion, a written statement, or a self-selected product.

Social Studies Objective
In their study of American culture, the students will be able to use what they have learned to discuss and decide whether assurances should be included in law that will maintain a balance between the need for order and the need for cultural identity and will present their ideas on this issue through a class discussion and a position paper.

The inclusion of issues within the study of a discipline provides gifted students with opportunities to develop and to use cognitive skills of critical thinking (including setting and using criteria to make judgments and discerning patterns and relationships). The use of issues will also allow students to consider the interrelatedness of information, causal relationships, and the relative (rather than the absolute) merits of diverse points of view.

Practice Templates: Issue-Based Objective

In their study of _____, the students will be able to use what they have learned to _____ _____ and will present their positions in a _____, a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ _____ and will present their positions in a _____, a _____, a _____, or a self-selected product.

Criteria

1. The content has some element of controversy in it and is therefore debatable.
2. There is no agreed upon "right answer" but a consensus could be reached.
3. Students must use skills of critical thinking.
4. The product form may serve as a forum for expressing multiple points of view.

CONTENT STRATEGY #2: PROBLEMS

Required content may be extended to include the study of complex problems related to a topic or an area of study within a discipline. As with the study of issues, it is essential that students have sufficient information about the topic or area of study to allow them to consider and generate unique, sophisticated, and realistic potential solutions for the problem. Students should also have knowledge of and experience in using skills of creative thinking, including skills of fluency, flexibility, elaboration, and originality.

Literature Objective
In their study of Romantic Era prose and poetry, the students will be able to use what they have learned to generate many and varied solutions for the problem of balancing elements of "realism" with elements of "romanticism" and will present their ideas in a class discussion, an illustration, or through a self-selected product.

Mathematics Objective
In their study of probability and statistics, the students will be able to use what they have learned to think of many and varied ways to solve problems relating to prediction in forecasting severe weather conditions and will share their ideas through a class discussion, a dramatization, a chart, or through a self-selected product.

Science Objective
In their study of physics, the students will be able to use what they have learned to add ideas responding to problems of heat and friction as they effect actual and proposed forms of transportation. The students will present their conclusions in a written report, a chart, or through a self-selected product.

Social Studies Objective
In their study of American culture, the students will be able to use what they have learned to generate new approaches for responding to the problems of collecting artifacts in ways that convey respect for cultures past and present. Students will present their ideas in a class discussion, a written proposal, or through a self-selected product.

By extending topics or areas of study within a discipline to include problem-based content, educators allow students to examine the ways in which seemingly discrete pieces of information may be interrelated. In addition, the use of problems in the curriculum will assist gifted students to become more proficient at problem finding as well as at problem solving.

Practice Templates: Problem-Based Objective

In their study of _____, the students will be able to use what they have learned to _____ _____ and will present their solutions in a _____, a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ _____ and will present their solutions in a _____, a _____, a _____, or a self-selected product.

Criteria

1. The content includes a challenge that has not yet been met.
2. There is no agreed upon "right answer" but a solution could be developed.
3. Students must use skills of creative thinking.
4. The product form may serve as a first step in solving the problem.

CONTENT STRATEGY #3: THEMES

Themes may be used to increase the complexity of content within an area of study. When used with a specific discipline, the use of a theme will allow students to examine the interrelationships between and among facts, details, rules, and concepts. When used across disciplines, a theme will allow students to study the inter-relatedness of areas of study.

Selected Themes

1. Change
2. Community
3. Conflict
4. Exploration
5. Force
6. Order
7. Patterns
8. Power
9. Structure
10. Systems

(From S. Kaplan and J. Curry, 1985)

For a theme to be effective, it is essential to select generalizations (or "big ideas") that can be verified and/or disputed in the course of study. The following are possible generalizations for the themes:

1. Change
   - –change generates additional change
   - –change can be either "good" or "bad"
   - –change is inevitable
   - –change is necessary for growth

2. Community
   - –a community has members
   - –community members share a common environment
   - –communities follow patterns of growth and change
   - –when one community comes in contact with another community, change may occur

3. Conflict
   - –conflict is composed of opposing forces
   - –conflict may be natural or human–made
   - –conflict may be intentional or unintentional
   - –conflict may allow for synthesis and change

4. Exploration
   - –exploration requires taking risks
   - –exploration confronts "the unknown"
   - –exploration may result in "new findings" or the confirmation of "old findings"
   - –exploration requires leadership (i.e., explorers)

5. Force
   - –force attracts, holds, or repels
   - –force influences or changes
   - –force and inertia are co-dependent
   - –force may be countered with equal or greater force

6. Order
   - –order may be natural or constructed
   - –order may allow for prediction
   - –order may communicate concepts
   - –order may have repeated patterns

7. Patterns
   - –patterns have segments that are repeated
   - –patterns allow for prediction
   - –patterns have an internal order
   - –patterns may have symmetry

8. Power
   - –power is the ability to influence
   - –power may be used or abused
   - –power is always present in some form
   - –power may take many forms (chemical, electrical, political, mechanical)

9. Structure
   - –structures have parts that interrelate
   - –parts of structures support and are supported by other parts
   - –smaller structures may be combined to form larger structures
   - –a structure is no stronger than its weakest component part

10. Systems
    - –systems work to complete a task or a mission
    - –systems are composed of sub-systems and parts
    - –parts of systems are interdependent upon one another and form symbiotic relationships
    - –a system may be influenced by other systems

Criteria for Assessing Potential Themes

Sandra Kaplan (1985) recommends that criteria be used for assessing whether or not a proposed theme is appropriate for developing thematic curricula. The criteria that she recommends have been adapted as follows:

1. Is the theme "universal" in its application?
2. Is the theme "timeless" in its applications?
3. Is the theme equally usable across disciplines?
4. Is the theme appropriate for students across age groups?
5. Is the theme capable of "carrying" important information?
6. Is the theme useful in making connections between and among disciplines?
7. Are there generalizations (or "big ideas") that can be used with the theme?

Topics (e.g., "dinosaurs," "westward movement," "frogs") do not qualify as themes using these criteria.

Writing an Objective Within a Discipline Using a Theme

Themes may be used within a discipline to assist students in understanding the interrelatedness of the information within a topic of study. The following are examples in the disciplines of literature, mathematics, science, and social studies. The following objectives use the theme of order and the generalization, *order may be natural or constructed*.

Literature Objective
In their study of order, the students will be able to use what they have learned to verify or dispute the assertion that American Romantic Era authors recognized that order may be natural or constructed and that they affirmed natural order and shunned constructed order (as represented by society). Students will use primary sources to collect data and will present their views in a class discussion, a written statement, and a self-selected product.

Mathematics Objective
In their study of order, the students will be able to use what they have learned about statistics and probability to verify or dispute that there are natural and constructed patterns of data. Students will use a case study approach to test their hypotheses and will present their conclusions through a written report accompanied by a graph, a diagram, or a chart.

Science Objective
In their study of order, the students will be able to use what they have learned about the laws of physics to determine whether constructed as well as natural orders must adhere to principles of conservation. Students will use primary and secondary sources and will present their conclusions through a written report, a series of illustrations, or a self-selected product.

Social Studies Objective
In their study of order, the students will be able to use what they have learned about the development and the diversity of the American culture to verify or dispute the assertion that societies are dependent on natural and constructed order for growth and survival. Students will collect information from historical and sociological studies and will present their conclusions in a written report, a speech, a series of illustrations, or a self-selected product.

Writing an Objective Across Disciplines Using a Theme

Themes may be used to "meld" disciplines into a common area of study. The number of disciplines to be included depends on the instructional goals. The following objectives use the theme of order and the generalization that *order may be natural or constructed*.

Literature and Social Studies Objective
In their study of order, the students will be able to identify examples of natural and constructed order in the folk tales, myths, and poetry of various cultural groups and will present their findings in a report that includes a chart, an illustration, and a written product form.

Mathematics and Science Objective
In their study of order, the students will be able to identify examples of natural and constructed order in laws of probability and in laws of physics and will present their findings in a report that includes a diagram, a graph, and one other visual product form.

Literature and Science Objective
In their study of order, the students will be able to compare and contrast constructed order in poetry with constructed (imposed) order in a scientific theory, noting similarities and differences, and will present their ideas through a self-selected product form.

Mathematics and Social Studies Objective
In their study of order, the students will be able to compare and contrast Eastern and Western concepts of prediction, noting similarities and differences, and will present their ideas through a visual or a written product form.

Literature, Mathematics, Science, and Social Studies Objective
In their study of order, the students will be able to use evidence from literature, mathematics, science, and social studies to verify or dispute the assertion that order may be natural or constructed. Students will present their conclusions in a kinesthetic, verbal, visual, or written product form.

In each of the examples, the theme of order is placed as the focus of content in the objective. There has been some debate as to whether the theme must be "explicit" or whether the theme may be "implicit" within an objective. Regardless, the focus should be on assisting students to understand the "big ideas" that are central to the areas of study.

Practice Template: Theme-Based Objective

In their study of _____, the students

will be able to use what they have learned to _____

_____ and will present their ideas in a

_____, a _____,

a _____, or a self-selected product.

In their study of _____, the students

will be able to use what they have learned to _____

_____ and will present their ideas in a

_____, a _____,

a _____, or a self-selected product.

Criteria

1. The content meets the criteria for a theme.
2. There is a generalization embedded within the objective.
3. Students use higher-order thinking skills.
4. The product forms allow for sophisticated restructuring of ideas.

Progressive Complexity in Levels of Content

Levels of complexity within the content of an area of study may be increased systematically without abandoning the responsibility to teach required facts, details, rules, and concepts.

Level	Example	Purpose
1. Topical	Christopher Columbus –background –purpose –influences	Mastery
2. Integrated	Columbus Day –art –literature –mathematics –social studies –science	Connections
3. Multidisciplinary	Explorers –kinds –characteristics –methodologies	Points of View
4. Interdisciplinary	Exploration –exploration requires taking risks –exploration confronts "the unknown" –exploration may result in "new findings" or the confirmation of "old findings" –exploration requires leadership	Big Ideas
5. Interthematic	Exploration (sub-themes) –order –patterns –systems	Discovery

(adapted from Sandra N. Kaplan, 1985)

The worksheets on the following pages are used to move through these levels of complexity. The levels of complexity do not suggest a pyramidal structure. Rather, the level of complexity should be selected based on the purpose for instruction. Topical content should be used when basic mastery of content is the purpose of instruction. Interdisciplinary content should be used when appreciation of "big ideas" is the purpose of instruction.

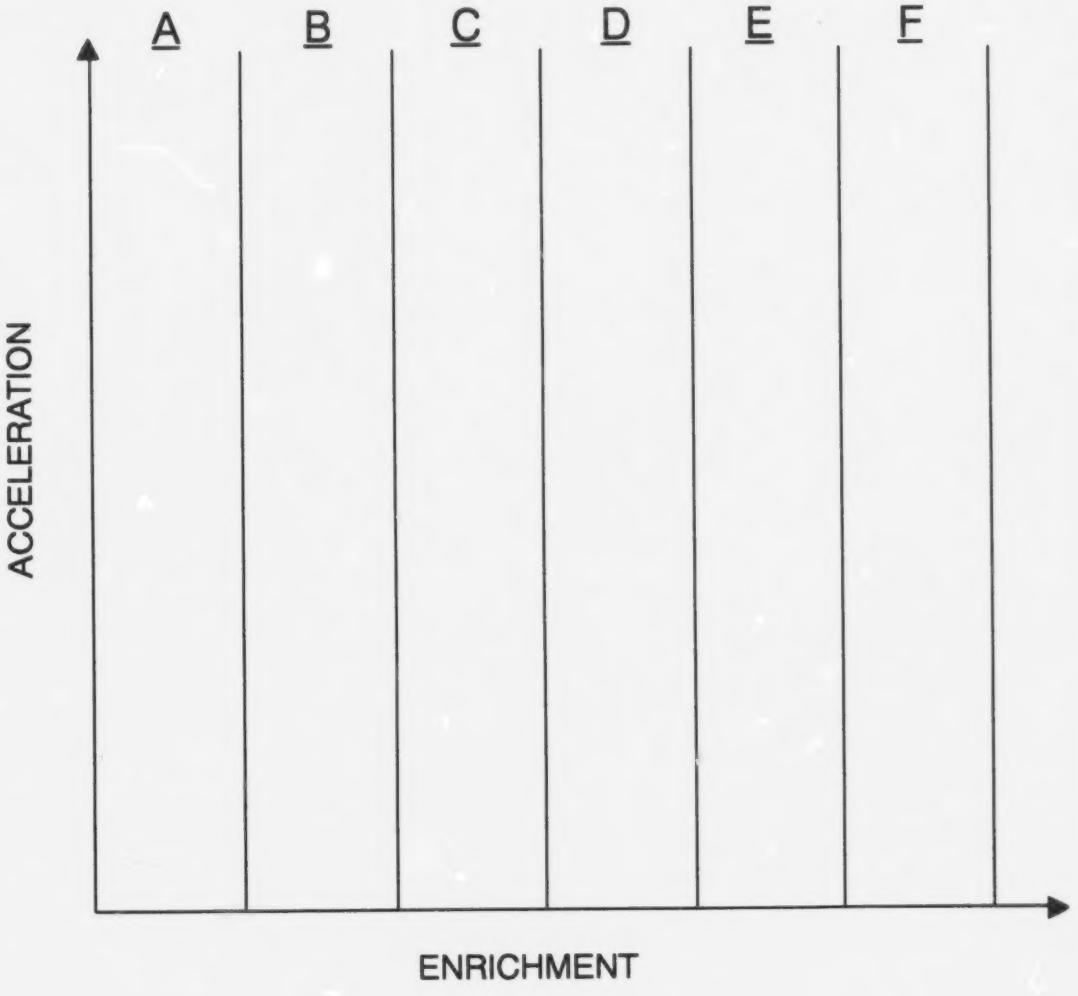
Worksheet #1:	Topical Content: Selection of Information
Worksheet #2	Topical Content: Acceleration and Enrichment
Worksheet #3:	Integrated Content: Contributions from Disciplines
Worksheet #4:	Multidisciplinary Content: Two Disciplines
Worksheet #5:	Multidisciplinary Content: Five Disciplines (Issue or Problem Focus)
Worksheet #6:	Interdisciplinary Content with Multiple Disciplines
Worksheet #7:	Thematic Content: Examining Relationships
Worksheet #8:	Thematic Content: Filling Gaps
Worksheet #9:	Thematic Content: Areas of Student Interest
Worksheet #10:	Thematic Content: Inductive and Deductive Approaches
Worksheet #11:	Thematic Content: Selecting a Theme (single discipline)
Worksheet #12:	Thematic Content: Selecting a Theme (two disciplines)
Worksheet #13:	Thematic Content: Selecting a Theme (multiple disciplines)
Worksheet #14:	Interthematic Content

worksheet #1

TOPICAL CONTENT: SELECTION OF INFORMATION						
	who	what	when	where	why	how
facts						
details						
rules						
concepts						

worksheet #2

TOPICAL CONTENT: ACCELERATION AND ENRICHMENT

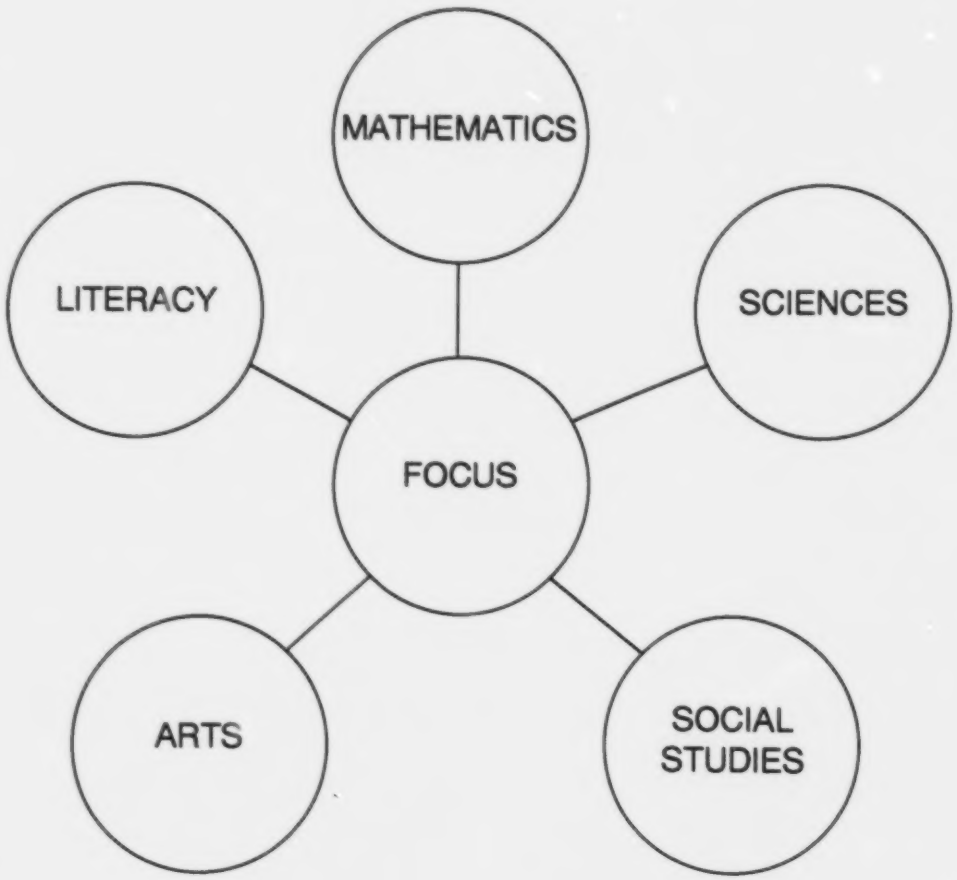


40

Adapted from Sandra Kaplan (1985)

worksheet #3

INTEGRATED CONTENT: DISCIPLINE CONTRIBUTIONS



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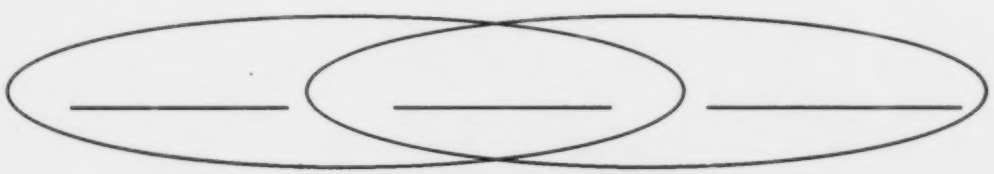
worksheet #4

MULTIDISCIPLINARY CONTENT: TWO DISCIPLINES

MULTIDISCIPLINARY CONTENT: TWO DISCIPLINES

MULTIDISCIPLINARY CONTENT: TWO DISCIPLINES



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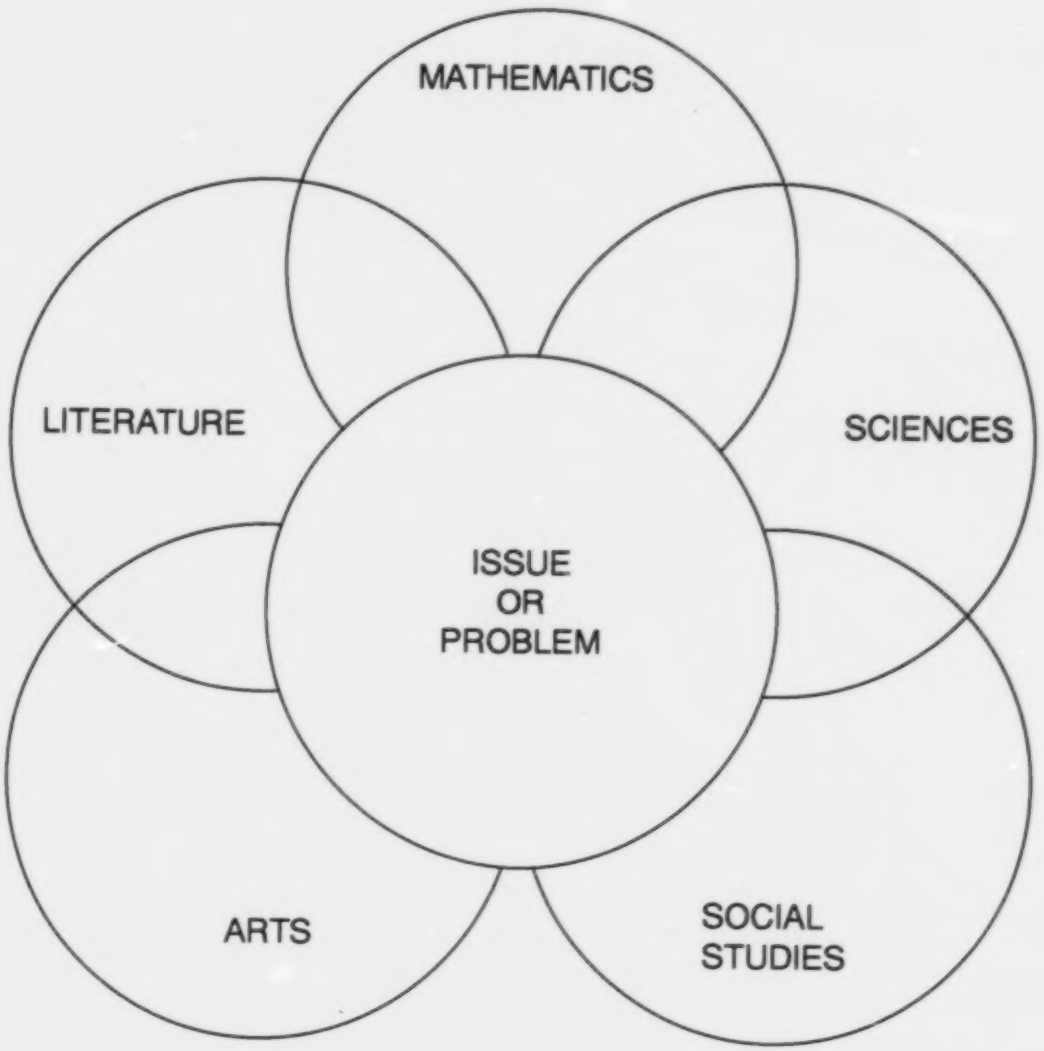
worksheet #5

MULTIDISCIPLINARY CONTENT: FIVE DISCIPLINES



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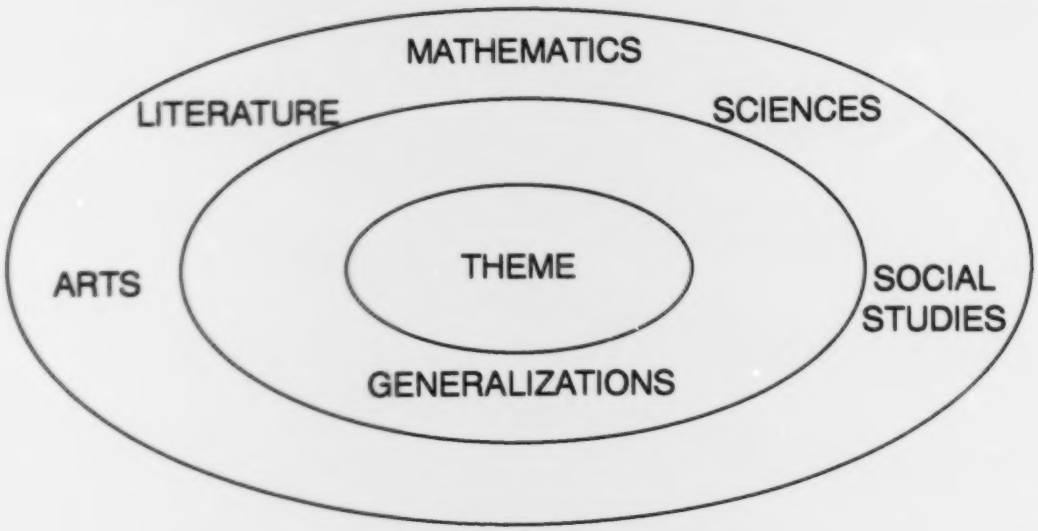
worksheet #6

INTERDISCIPLINARY CONTENT: MULTIPLE DISCIPLINES



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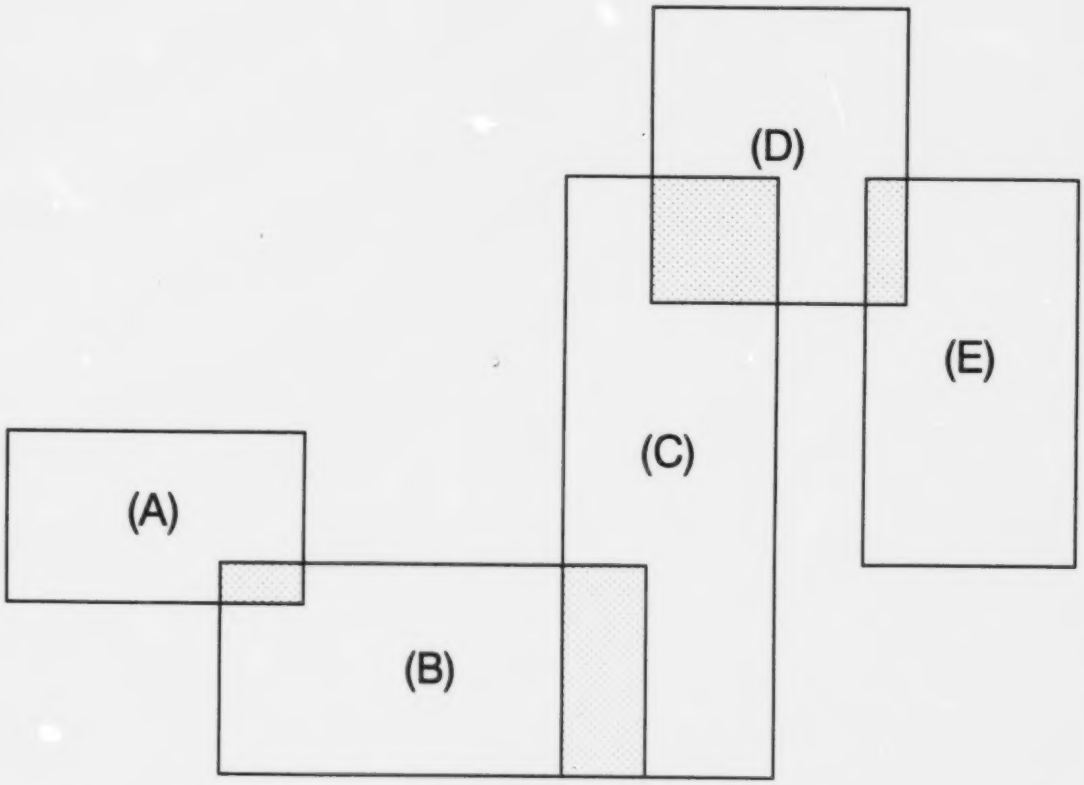
Adapted from Sandra Kaplan (1985)

worksheet #7

THEMATIC CURRICULUM: EXAMINING RELATIONSHIPS



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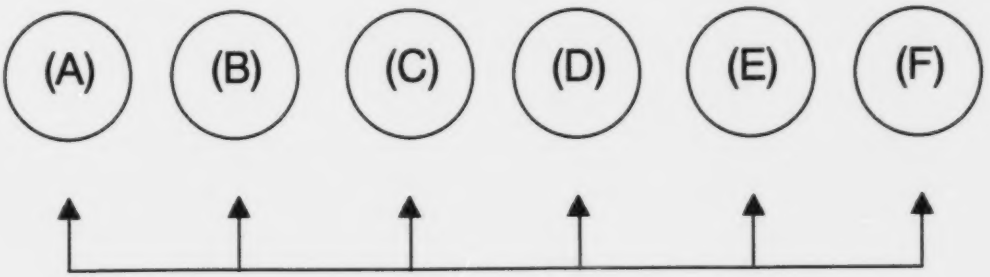
Adapted from Sandra Kaplan (1985)

worksheet #8

THEMATIC CONTENT: FILLING GAPS



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Adapted from Sandra Kaplan (1985)

worksheet #9

THEMATIC CONTENT: AREAS OF STUDENT INTEREST

STUDENTS' INTERESTS:		SUB-THEMES:
1. ANIMALS	→	COMMUNITY
2. SCIENCE FICTION	→	EXPLORATION
3. FASHION	→	CHANGE
4. ECOLOGY	→	SYSTEMS
5. SPORTS	→	STRUCTURE
6. COOKING	→	PATTERNS
7. COMICS	→	CONFLICT
8. POLITICS	→	POWER

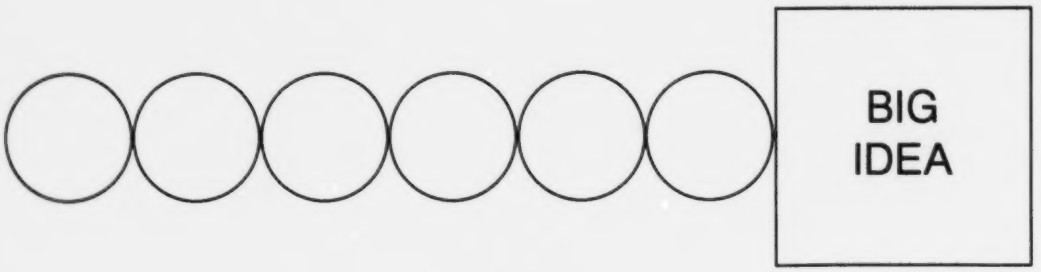
ORGANIZING THEME: ORDER

- MAY BE NATURAL OR CONSTRUCTED
- MAY ALLOW FOR PREDICTION
- MAY COMMUNICATE CONCEPTS
- MAY HAVE REPEATED PATTERNS
- MAY HAVE ELEMENTS OF CHAOS

Adapted from Sandra Kaplan (1985)

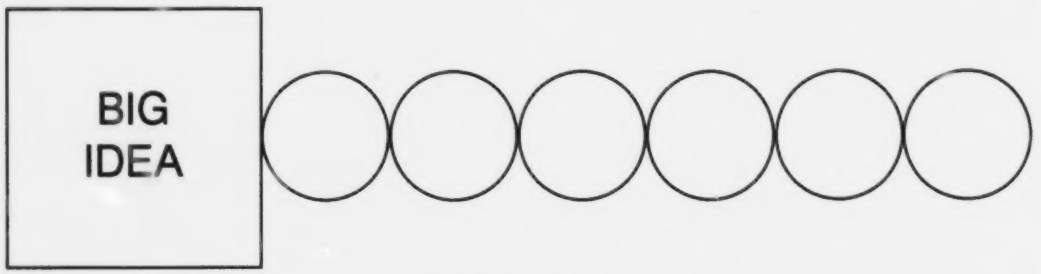
worksheet #10

THEMATIC CONTENT: INDUCTIVE & DEDUCTIVE



INDUCTIVE

(reasoning from the particular to the general)



DEDUCTIVE

(reasoning from the general to the specific)

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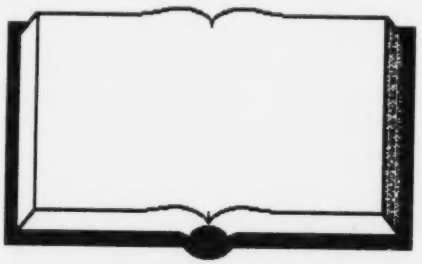
worksheet #11

SINGLE-DISCIPLINE APPROACH



TOPICS:

THEME

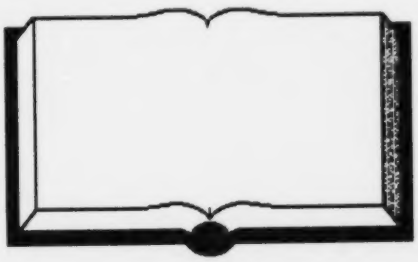
GENERALIZATION

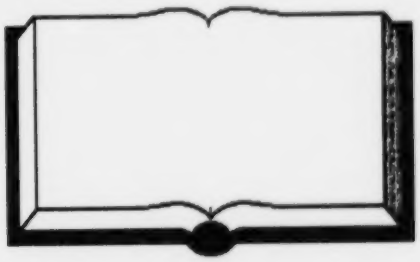
OBJECTIVE

ACTIVITY

worksheet #12

DOUBLE-DISCIPLINE APPROACH





TOPICS:

TOPICS:

THEME

GENERALIZATION

worksheet #13

MULTIDISCIPLINE APPROACH

TOPICS:	TOPICS:	TOPICS:	TOPICS:

THEME

GENERALIZATION

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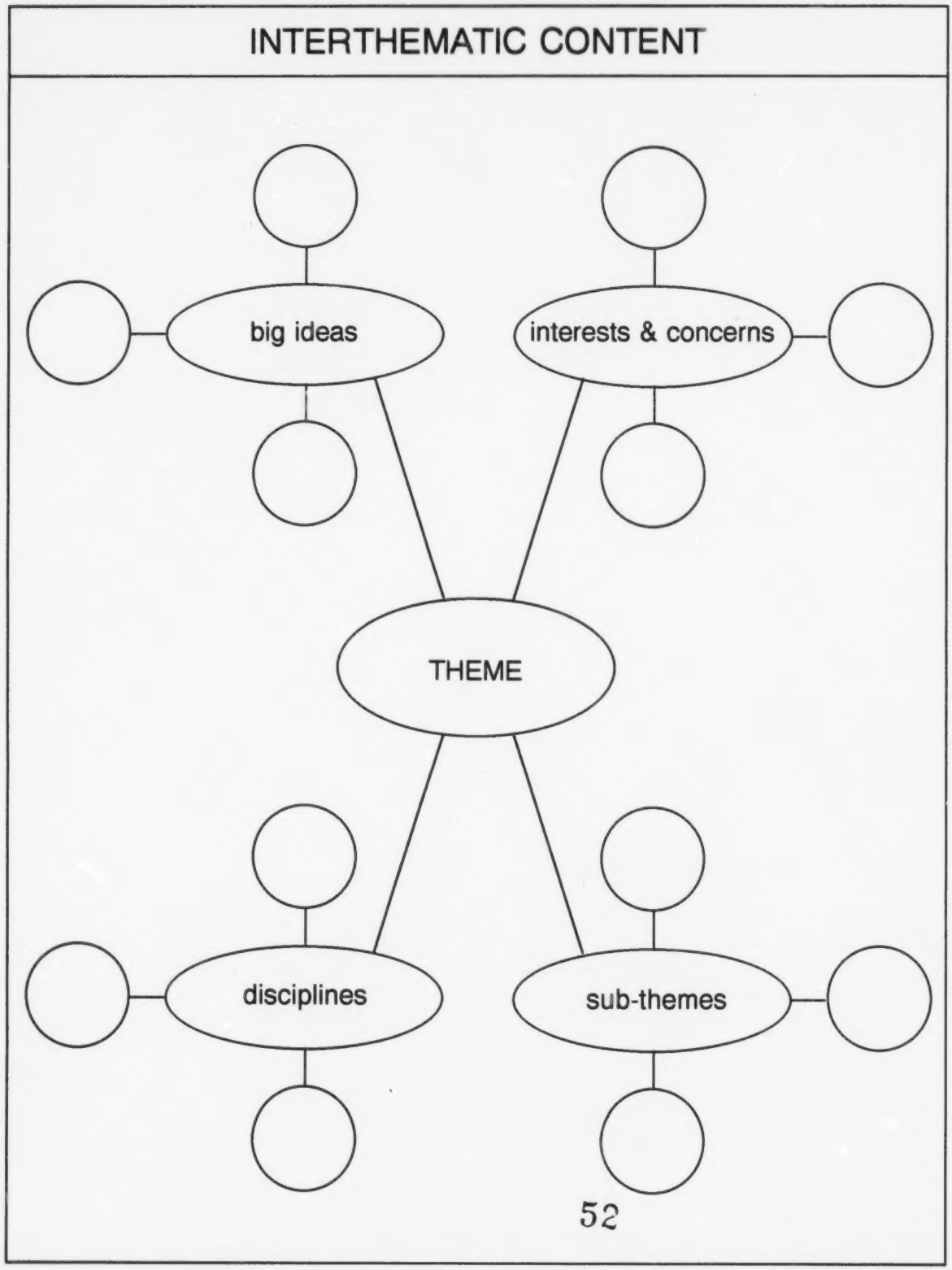
worksheet #14



Notes:

SECTION II:

PROCESS DIFFERENTIATION

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CREATIVE THINKING

Creative thinking skills include the mental tools that allow students to generate ideas. These tools have been classified by some educators into four categories: fluency, flexibility, elaboration, and originality. Each category has its own function in creative thinking.

- "Fluency" focuses on generating many ideas.
- "Flexibility" focuses on changing ideas.
- "Elaboration" focuses on adding to or extending ideas.
- "Originality" focuses on generating new, unique ideas.

While these categories are presented separately, they may overlap. For example, one might generate many unique ideas (combining fluency and originality) or add to an idea by combining it with another idea (using both elaboration and flexibility).

Using creative thinking skills with required content or with extended content provides educators with instructional opportunities to:

1. reinforce students' understandings of basic skills and required information;
2. facilitate the learning and the usage of productive thinking by students;
3. motivate students to synthesize course content with their own experiences and ideas;
4. assist students to be effective consumers and innovative producers of information;
5. allow students to demonstrate mastery of content through preferred styles of learning;
6. respond to various levels of student interests, abilities, and readiness;
7. make "teaching" more interesting to the teacher.

On the following pages are planning sheets for each of the creative thinking skills areas: fluency, flexibility, elaboration, and originality. At the top of each initial page, a template for writing an objective is provided, along with verb options that may be "slotted" into the process section of an objective. Sample objectives are offered in the content areas of literature, mathematics, science, and social studies. Graphic organizers are provided that may be used to teach the skills of creative thinking to students. The templates and the graphic organizers may be utilized with any area of content and at any grade level.

Creative Thinking Skill #1: Fluency

Learning Objective Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, a _____, or a self-selected product.

Verb Options

- Brainstorm a variety of means to ...
- Come up with many ideas to ...
- Generate a lot of alternatives to ...
- Give at least ___ ideas for ...
- Greatly increase ...
- List all of the situations wherein ...
- Think of many ways to ...

Learning Objective Examples

Example: Language Arts
In their study of American Romantic Era literature, the students will be able to use what they have learned to generate many ideas for celebrating individual identities within a national identity and will present their ideas through a written product form.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to think of many ways to use the skills of prediction in everyday life and will share their ideas through a written list or a self-selected product.

Example: Science
In their study of the physics of energy and work, the students will be able to use what they have learned to generate multiple working hypotheses regarding ways in which the choice of an energy source might impact the environment and will share their ideas through a visual or a written product form.

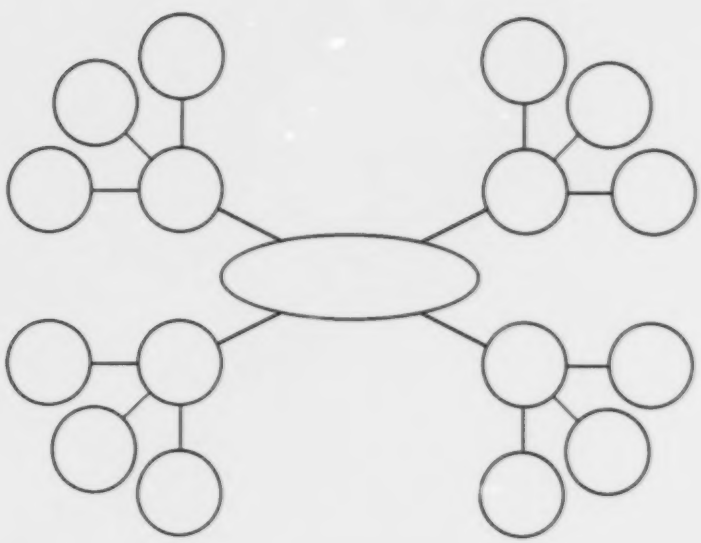
Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to generate many ideas as to how cultural, ethnic, and racial groups might celebrate their positive contributions to society and will present their ideas through a verbal or a written product form.

Practice Templates: Fluency

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: WEBBING



Creative Thinking Skill #2: Flexibility

Learning Objective Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, a _____, or a self-selected product.

Verb Options

- Adapt ...
- Combine/Change ...
- Eliminate ...
- Modify/Maximize/Minimize ...
- Put to other uses ...
- Reverse/Rearrange ...
- Speculate, what would happen if ...
- Substitute ...
- Suppose in what ways might we ...

Learning Objective Examples

Example: Language Arts
In their study of the American Romantic Era literature, the students will be able to use what they have learned to speculate on the ways the protagonist of one story might have responded in another story setting and will present their ideas through a script and an illustration.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to speculate on ways in which random occurrences might be used to form new concepts of order and will present their ideas through a verbal or a visual product form.

Example: Science
In their study of laws of physics, the students will be able to use what they have learned to speculate what might happen if one of the laws were not valid all of the time and will present their ideas through a scenario or a research proposal.

Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to speculate on what might have happened if one of the contributions by an ethnic group had not been made and will present their speculation through a written and a dramatized scenario.

Practice Templates: Flexibility

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: MATRIX

Creative Thinking Skill #3: Elaboration

Learning Objective Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, a _____, or a self-selected product.

Verb Options

- Add _____ to make it more ...
- Add to ...
- Append ...
- Build on ...
- Enlarge ...
- Extend ...

Learning Objective Examples

Example: Language Arts
In their study of American Romantic Era literature, the students will be able to use what they have learned to add words and phrases to a section of a story or poem in order to increase the level of intensity or action. Students will present their ideas through a written script.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to add rules to an unfair game that would make it fair and will share their ideas through a re-written rule book or a checklist.

Example: Science
In their study of the physics of energy and work, the students will be able to use what they have learned to elaborate on ways for conserving energy in the community and will share their ideas through a self-selected product form.

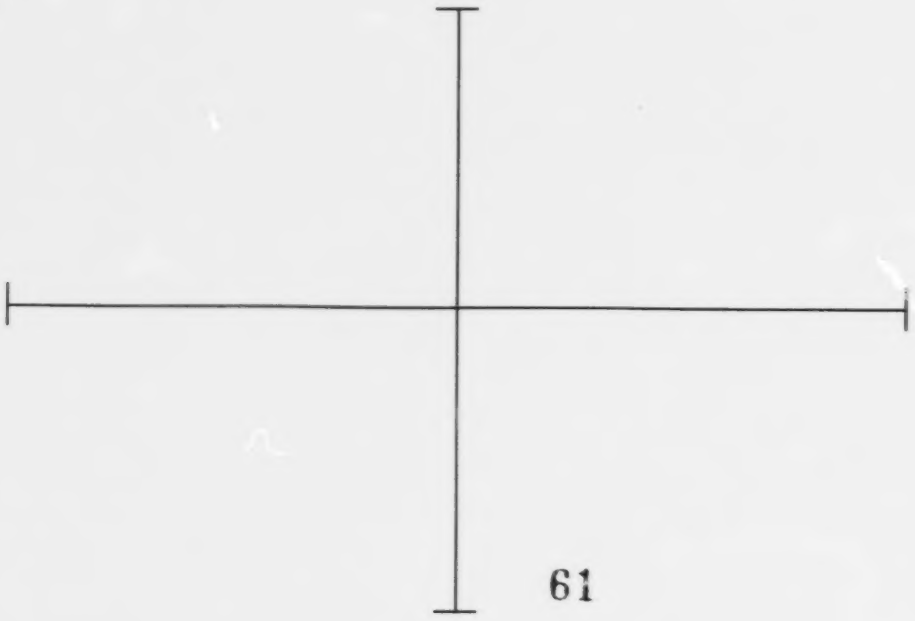
Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to elaborate on ways in which equity and access might be balanced fairly and will present their ideas through a speech or a story.

Practice Templates: Elaboration

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: HORIZONTAL AND VERTICAL SCALE



Creative Thinking Skill #4: Originality

Learning Objective Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, a _____, or a self-selected product.

Verb Options

- Create a new way to ...
- Design or invent a ...
- Develop a unique process for ...
- Give "zany" or unusual ideas to ...
- Imagine how they could ...
- Show their own ideas about ...
- Suggest diverse improvements for ...
- Suppose that ...
- Think of an idea that no one else has thought of to ...

Learning Objective Examples

Example: Language Arts
In their study of American Romantic Era literature, the students will be able to use what they have learned to think of unique ways in which "order" may be used to enhance freedom and will share their ideas through a visual or a written product form.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to think of unique ways to present narrative information through graphic representations and will present their ideas through a visual product form.

Example: Science
In their study of the mechanics of physics, the students will be able to use what they have learned to design the plans for a unique "perpetual motion machine" and will present their ideas in a model and in a narrative.

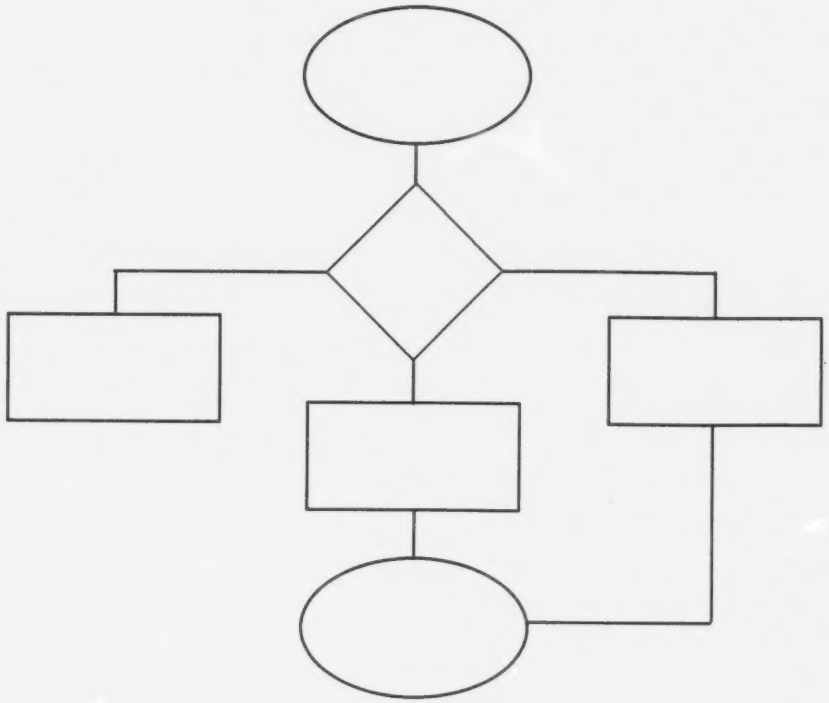
Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to think of unique ways that order might be used to enhance the contributions of groups and will present their ideas through a verbal or a visual product form.

Practice Templates: Originality

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: FLOWCHART



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Creative Thinking Skills and Inquiry Learning

In encouraging creative thinking in the classroom, teachers may wish to consider using the skills of fluency, flexibility, elaboration, and originality with an "inquiry" method at the beginning of a lesson in order to assist students in determining what they already know about a topic and to learn from their class peers.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, a _____, or a self-selected product.

Example: Literature (with skills of fluency)
Students might, prior to the reading selections from American Romantic Era literature, be invited to list as many attributes of "nature" and "society" as they can in order to compare their list with the perceptions of authors.

Example: Mathematics (with skills of flexibility)
Students might be invited to play and modify games that use laws of probability and statistics and to discuss what portions of the games seemed "fair" or "unfair."

Example: Science (with skills of elaboration)
Students might be invited to think of ways in which their own knowledge of mechanics has added to their understanding of "how things work" in the world and will note these connections in amusement parks, their homes, and in school.

Example: Social Studies (with skills of originality)
Students might be asked to imagine new and unusual ways for people to have their ideas and their rights represented in a legislative branch of government prior to learning ways that they actually can lobby their representatives.

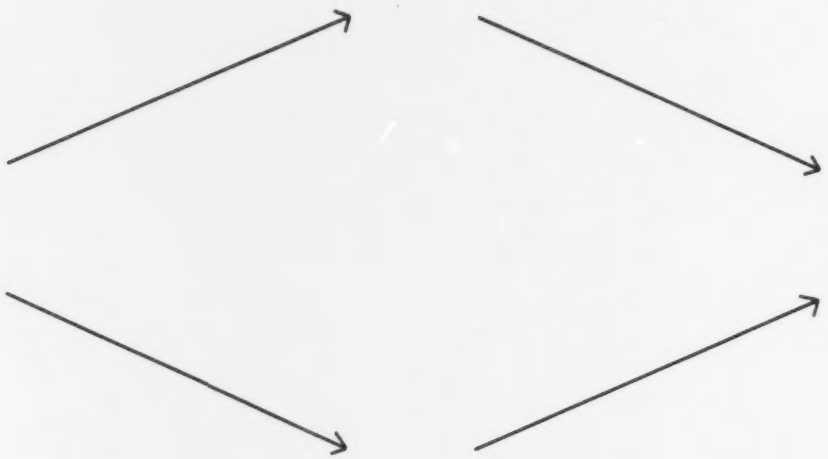
These examples use skills of creative thinking at the beginning of a lesson via an inquiry approach rather than at the end of a lesson to reinforce previously learned information.

Practice Templates: Creative Thinking and Inquiry Activities

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: DIVERGENT AND CONVERGENT ARROWS



CRITICAL THINKING

Critical thinking skills include the mental tools that allow students to analyze, judge, defend, and dispute ideas. These tools have been classified by educators in a variety of ways. However, the "heart" of each classification system is an emphasis on assisting students to set and use criteria for making decisions. In this chapter, strategies are presented for incorporating critical thinking skills into learning objectives.

The purposes of teaching critical thinking skills to students in all disciplines include assisting students to:

1. make informed judgments about the information (and the decisions that have been made) within a field of study;

2. understand how to examine existing criteria for validity and appropriateness;

3. understand how to generate and/or adapt criteria for making judgments;

4. understand how critical thinking skills can provide guidance in the decision making process;

5. be good "consumers" of information within a discipline and across disciplines;

6. prepare for their roles as leaders and decision-makers in our society and in the world community.

Critical thinking skills do not "tell" students what to think. Rather, critical thinking skills assist students in making informed, valid, and thoughtful choices. One of the larger goals of critical thinking is to assist students in becoming reflective thinkers.

There are cognitive and affective dimensions of critical thinking. Students may apply their thinking skills to academic disciplines in areas of study and they may apply these same thinking skills to the examination and the modification of perceptions and attitudes. In both cases, students will need the skills and the propensities of a good critical thinker.

On the following pages are planning sheets for selected skills of critical thinking. At the top of each initial page, the skill is explained, a template for writing an objective is provided, and verb options are listed that may be "slotted" into the process section of an objective. Sample objectives are offered in the content areas of literature, mathematics, science, and social studies. Also, for each critical thinking skill, there are "sample templates" (for teachers to write their own objectives) and a "graphic organizer" to use with students. These planning sheets may be used with any area of content and at any grade level.

Robert Ennis (1962) has delineated "Twelve Aspects of Critical Thinking" that may be used in curriculum construction. The aspects are:

- grasp the meaning of a statement
- judge whether ambiguity exists
- judge if contradiction exists
- judge if a conclusion necessarily follows
- judge the specificity of a statement
- judge if a statement relates to a certain principle
- judge the reliability of an observation
- judge if an inductive conclusion is warranted
- judge if a problem has been identified
- judge if a definition is adequate
- judge if a statement is credible
- judge if something is an assumption.

[See Ennis, R.H., "A Critical Concept of Critical Thinking," *Harvard Review*, 32 (1), Winter 1962.]

These verb phrases may be inserted into an objective, thereby "aiming" the thinking of the students toward critical thinking.

Example:
In their study of (an author's theory), the students will be able to use what they have learned to *judge if a conclusion necessarily follows* and will present their opinions in a class discussion.

Teachers in each content area should assist students to examine the statements made about the information within disciplines. Students must be proficient consumers of information, and good consumerism requires skills of discernment.

Practice Template

In their study of_____, the students will be able to use

what they have learned to _____

and will share ideas through a _____, a_____,

or a self-selected product.

Strategy #1: Select an Appropriate Verb

Educators may increase the likelihood that students will think critically if the thinking skill within the learning objective requires students to make judgments. The following (alphabetized) verbs may be used for this purpose:

-analyze	-define	-estimate	-prove
-classify	-detect	-formulate	-select
-conclude	-determine	-interpret	-show
-criticize	-dispute	-judge	-test
-defend	-distinguish	-propose	-verify

Critical thinking demands the use of analytical, evaluative, and logical thinking. By placing one of the above verbs in the "process" slot of the following objective template, the educator will be able to "aim" the thinking of students toward critical thinking.

In their study of_____, the students will be able to use

what they have learned to _____

and will share ideas through a _____, a_____,

or a self-selected product.

Of course, the verb must be followed by information (related to the "content" of the objective) that will facilitate critical thinking.

Example: Language Arts
In their study of American Romantic Era literature, the students will be able to use what they have learned to defend or dispute the ideal of "heroism" presented by one of the authors and will defend their views in a debate and an editorial.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to assess and interpret the data presented by a classmate and will present their evaluation through a matrix.

Example: Science
In their study of laws of physics, the students will be able to use what they have learned to verify or dispute with evidence that gravity is a property of space, not of physical objects, and will present their ideas through a lab report.

Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to distinguish ways in which a society may encourage or discourage the contributions of groups and will present their findings in a chart and in a discussion.

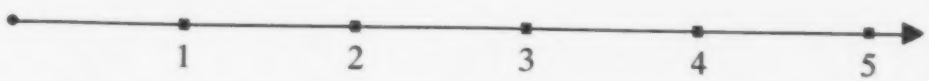
Practice Templates

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: LIKERT SCALE

content:



process:

product:

Strategy #2: Using Dichotomous Relationships

Anita Harnadek (1976), in her book *Critical Thinking: Book One*, presents useful information on critical thinking skills and also provides a number of exercises for practicing these skills. Several of the activities encourage the student to examine dichotomous relationships, including:

- Resolvable vs. Ambiguous
- Possible vs. Probable
- Literal vs. Figural
- Factual vs. Emotional

The first two "pairs" have been adapted for use in this publication.

2.1 Resolvable vs. Ambiguous

One area where a dichotomy may be established for the purpose of critical thinking is in the area of "resolvable" versus "ambiguous." The following phrases may be of assistance in constructing objectives.

- Determine whether the answer is recorded ...
- Verify or dispute the source(s) of the answer ...
- Give evidence from sources that will support ...
- Detect inconsistencies in opposing arguments which ...
- Conclude from evidence that ...

[Adapted from Anita Harnedek (1976), *Critical Thinking: Book One*, Midwest Publications, Pacific Grove, CA]

Example: Language Arts
In their study of American Romantic Era literature, the students will be able to give evidence that supports or refutes the assertion that the term "nature" is used in a consistent manner by major authors of the time and will present conclusions in oral and written reports.

Example: Mathematics
In their study of probability and statistics, the students will be able to give evidence from sources to verify or dispute the position that no systematic bias exists in a census poll and will present their conclusions in a class discussion, a written statement, or a self-selected product.

Example: Science
In their study of order in physics, the students will be able to use what they have learned to detect inconsistencies in the arguments of Aristotle, Galileo, Newton, Einstein, Schroedinger, or Heisenberg regarding the probable order of the universe and will present their conclusions in a written report and a chart.

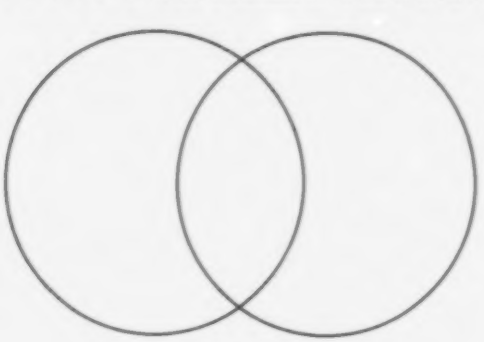
Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to conclude from evidence whether the proposition that America is a "melting pot" of cultures is "knowable" or "ambiguous" and will present their positions in a debate.

Practice Templates

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: VENNGRAM



2.2 Probable vs. Possible

A second area of dichotomy that may be used to encourage critical thinking skills is that of "probable" versus "possible." The following verb phrases may be useful in constructing objectives.

- Conclude and verify with certainty that ...
- Conclude and verify that it is probable ...
- Conclude and verify that it is possible ...
- Determine whether ____ is certain, probable, possible, or impossible . . .

[Adapted from Anita Harnedek (1976), *Critical Thinking: Book One*, Midwest Publications, Pacific Grove, CA]

Example: Language Arts
In their study of American Romantic Era literature, students will be able to use what they have learned to determine whether the assertion "order may have elements of chaos" is certain, probable, possible, or impossible, and will present their positions in a class discussion and with reference cards.

Example: Mathematics
In their study of probability and statistics, students will be able to use what they have learned to conclude and verify with certainty that a rule of a game is or is not fair and will present their ideas through a written or an oral report.

Example: Science
In their study of quantum physics, students will be able to use what they have learned to conclude whether or not the present explanation of the relationship between matter and energy is "possible" or "probable" and will present their conclusions in a written report with charts.

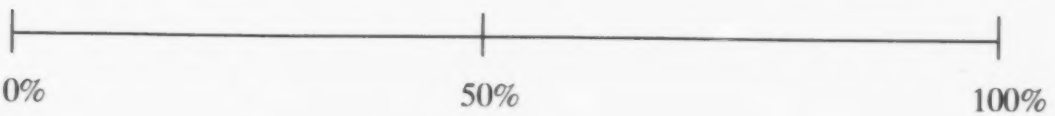
Example: Social Studies
In their study of American culture, students will be able to conclude and verify whether that it is certain, probable, possible, or impossible that a democratic society will benefits from encouraging diversity of opinions and will present their positions in a self-selected product form.

Practice Templates

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: PERCENTILE SCALE



Strategy #3: Set and Use Criteria

It is essential that students learn how to set and use criteria if they are to think critically. Students should learn about and be able to use several types of criteria.

3.1 Yes vs. No Criteria

3.2 Non-negotiable Criteria

3.3 Objective Criteria

3.4 Subjective Criteria

3.5 Weighted Criteria

These types are not "discrete"; that is, they overlap with one another. For example, a weighted criterion may be objective or subjective.

3.1 Yes vs. No Criteria

Yes/No criteria are used when "membership" or "belonging" is being established. If a person, place, or thing has the requisite attribute, then a "yes" (qualifying) mark may be given; if not, then a "no" (disqualifying) mark may be given.

Example: Language Arts
In their study of American Romantic Era, the students will be able to determine with literary evidence the degree to which Mark Twain does or does not belong to this school of literature. Students will present their conclusions in a class discussion and a checklist.

Example: Mathematics
In their study of probability and statistics, the students will be able to use what they have learned to set and use criteria to distinguish between examples of "natural" and "constructed" order and will present their conclusions in a visual product form.

Example: Science
In their study of physics, the students will be able to use what they have learned to determine (using established criteria) the degree to which a phenomenon is or is not a viable form of energy and will present their findings in a matrix and in an oral report.

Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to determine the ways in which specific historical documents have protected the rights of individuals and will present their conclusions in a chart.

Practice Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: MATRIX

3.2 Non-negotiable Criteria

A non-negotiable criterion is used when there is no room for compromise. It is used the same way as a "yes/no" criterion, but with different consequences. If a non-negotiable criterion is not met, then the "candidacy" of the idea or the item will be rejected. Matters of degree are not considered: something qualifies or it does not — *sine qua non*.

Example: Language Arts
In their study of American Romantic Era literature, the students will use the criterion "return to nature" to determine with evidence that specific poems do or do not belong to this school of literature and will present their conclusions in a class discussion and in a position paper.

Example: Mathematics
In their study of probability and statistics, the students will use established criteria to determine whether or not data were collected fairly in a national census poll and will give their assessment in a debate or in an editorial.

Example: Science
In their study of mechanics, the students will be able to use what they have learned to decide with evidence whether a "perpetual motion machine" is or is not a scientific possibility and will present their findings in a report and a checklist.

Example: Social Studies
In their study of American culture, the students will set and use criteria to determine whether a specific person was an effective leader in a cause or in a political office. Students will present their conclusions in a checklist.

Practice Templates

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

GRAPHIC ORGANIZER: CHECKLIST

_____ 1.

_____ 2.

_____ 3.

_____ 4.

_____ 5.

_____ 6.

_____ accept _____reject

3.3 Objective Criteria

An objective criterion is used when there is a need to determine questions of "degree" or to measure relative value. Numbers are used as ordinal measurements for ratings and comparisons. For example, the number 5 might indicate "excellent" while the number 1 might indicate "unacceptable." In order to make judgments, specific parameters must be determined that will allow for valid comparisons.

Example:
5 = 500 - 401 interval units of measurement
4 = 400 - 301
3 = 300 - 201
2 = 200 - 101
1 = 100 - 001

Example: Language Arts
In their study of American Romantic Era literature, the students will establish and utilize fiscal criteria to examine the viability of restoring Walden Pond to its natural state and will present their conclusions in a written report.

Example: Mathematics
In their study of probability and statistics, the students will set and utilize at least three objective criteria to affirm or dispute the validity and the reliability of conducting national surveys through telephone interviews and will present their conclusions in a matrix and in an editorial.

Example: Science
In their study of mechanics, the students will use established criteria to measure through an experiment the impact of bicycle construction on performance and will report their conclusions in a written report with graphs.

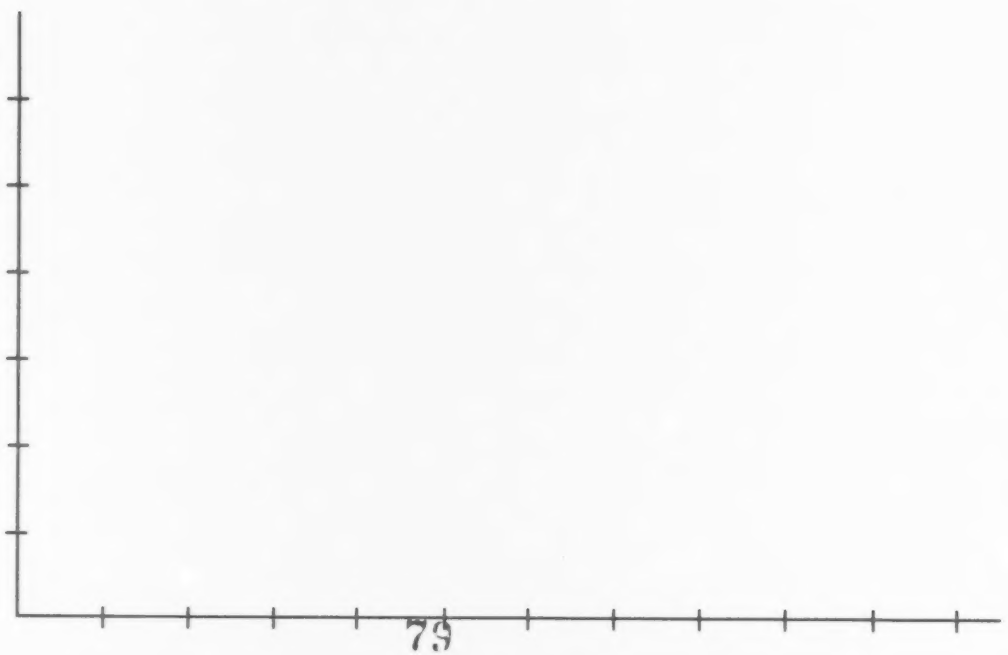
Example: Social Studies
In their study of American culture, the students will be able to use what they have learned to set and use objective criteria to compare and contrast the expansion of individual vs. institutional rights through decisions by the courts and will present their findings in a written report and a time line.

Practice Template

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

In their study of _____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a _____, or a self-selected product.

GRAPHIC ORGANIZER: SCATTER GRAM



3.4 Subjective Criteria

A subjective criterion is used to measure "soft data" that may not be easy to quantify. This does not suggest that subjective measurements are not as important as objective measurements. It does mean that students should have skills of making judgments in matters of perception, preference, style, and attitude. Subjective criteria can be quantified for the purpose of decision-making. Ratings may be based on a "case study" approach, an "attributes" approach, or on expert opinion.

Example: Language Arts
If students are examining authors' affirmation of individualism through American Romantic Era literature, then students may establish a basis for comparisons and ratings by developing a set of traits that distinguish a high level of individualism (rating of 5), a moderate level of individualism (rating of 3), and a minimal level of individualism (rating of 1).

Objective: In their study of American Romantic Era literature, the students will set and use subjective criteria to judge the relative levels of individualism affirmed by authors in selected pieces of prose and poetry and will present their findings in a class discussion and on a pie chart.

Example: Mathematics
If students are studying the communication of mathematical concepts such as the use of probability and statistics, then students may set and use subjective criteria for assessing the efficacy of various visual product forms in conveying information regarding research findings. By examining a number of examples, the students may be able to establish a rating system for judging new forms.

Objective: In their study of the use of probability and statistics, the student will be able to use what they have learned to set and use subjective criteria for rating the relative merits of visual product forms in conveying information and will present their ideas in a class discussion and a bar graph.

Example: Science
If students are studying issues and problems relating to the development and use of energy sources, then students might set and use subjective criteria to assess the impact of major construction projects on the lives of people in nearby communities and they might use the information to make judgments about development of power or disposal plants.

Objective: In their study of the development and use of energy sources, the students will be able to set and use subjective criteria for judging the impact of proposed power plants on the quality of life in local communities and will present their conclusions in a class discussion and a written report.

Example: Social Studies
If students are studying the direct and indirect contributions of various ethnic groups to American culture, then students might set and use subjective criteria to research and to assess the impact of the groups on the development of American legal traditions.

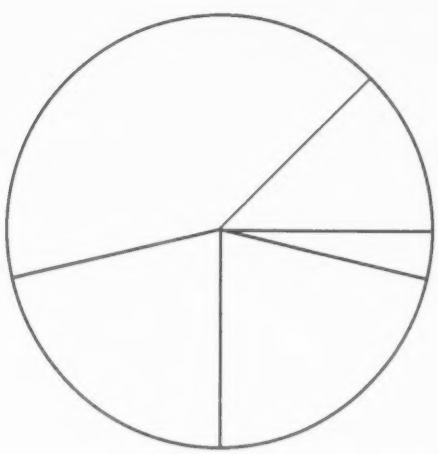
Objective: In their study of American culture, students will be able to use what they have learned to set and use subjective criteria for assessing the contributions of selected groups to the development of American legal traditions and will present their findings in a class presentation and in a poster.

Practice Templates

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

GRAPHIC ORGANIZER: PIE CHART



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3.5 Weighted Criteria

A weighted criterion is used when there is a need to give one criterion more influence than other criteria in making a decision. A judgment can be made as to how much weight to give a criterion. For example, if other criteria are rated on a five-point scale (5 = excellent and 1 = poor), then a criterion with a weight of 2 would receive double the score (10 = excellent, 2 = poor). A criterion should only be given a "weight" if it truly is proportionally more significant that other criteria being used for judgment.

Practice Templates

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

In their study of_____, the students will be able to use what they have learned to _____ and will share ideas through a _____, a_____, or a self-selected product.

GRAPHIC ORGANIZER: WEIGHTED EVALUATION GRID

(see next page)

	CRITERION #1	CRITERION #2	CRITERION #3 (2X)	TOTAL SCORE
IDEA #1				
IDEA #2				
IDEA #3				
IDEA #4				

CREATIVE PROBLEM SOLVING

Problem solving combines the skills of creative thinking and of critical thinking to provide a method of exploring, understanding, and solving problems. The Creative Problem Solving (CPS) process, as presented by Isaksen and Treffinger (1985), is divided into six "stages":

1. Mess-finding
2. Data-finding
3. Problem-finding
4. Idea-finding
5. Solution-finding
6. Acceptance-finding

[See Isaksen, S.G. & Treffinger, D.J. (1980). *Creative Problem Solving: The Basic Course*. Buffalo: Bearly Limited.]

A definition for each stage is included at the top of the worksheets that are included in this section. Each stage has two phases: a "divergent" phase (in which there is a focus on generating ideas) and a "convergent" phase (in which there is a focus on narrowing or judging ideas). Sample objectives in the content areas of language arts, mathematics, science, and social studies have been developed for the divergent phase and the convergent phase of each stage of creative problem solving to demonstrate how the CPS process can be utilized with required subject matter.

Creative Problem Solving: Multi-Stage Applications

Example: Language Arts
In language arts, the American Romantic Era has been used as the focus of content. However, the creative problem solving process may be used with any genre or any piece of literature in which a problem must be understood, confronted, and resolved. The sample objectives for American Romantic Era literature move sequentially through each stage of creative problem solving, allowing students to (1) consider the "mess" regarding the individual-versus-society dilemma, (2) determine in what ways this school of literature contributed to an examination and an understanding of individualism, (3) identify the nature of the problems confronting romanticism, (4) generate ideas for responding to the problems, (5) judge the options for solutions that may be available, and (6) decide how selected strategies for bringing about the acceptance of ideas might be implemented.

Example: Mathematics
In mathematics, the area of regression correlation (i.e., prediction) has been used as the focus of content. While the nature of mathematics is such that the use of the entire (and sequential) creative problem-solving process may not be viable with all areas of study, the individual stages of the process may be used with selected areas and applications of mathematics. The creative problem solving process is applied to the use of prediction and consumerism. In the objectives, students are

guided toward (1) considering the reasons for and the practices of making predictions, (2) collecting data regarding specific successful and unsuccessful applications of prediction, (3) determining the problems and the sub-problems regarding making predictions, (4) generating ideas for responding to the problems of making predictions accurately, (5) setting and using quantitative criteria for assessing potential solutions, and (6) planning strategies for implementing selected ideas.

Example: Science
In science, the area of the mechanics of physics has been used as the focus of content. There are inherent "problems" in the study of mechanics that make it a prime area with which to use the creative problem solving process. The sample objectives move sequentially so that students may (1) consider the "mess" influencing the use of the scientific method, (2) understand alternative ways to interpret scientific data, (3) generate and select problem statements about the development of new scientific theories, (4) use scientific theory to produce ideas for responding to problems relating to energy, (5) set and use criteria for assessing the ideas generated, and (6) select a plan for implementing selected ideas.

Example: Social Studies
In social studies, the study of American culture has been selected as the focus of content. Many groups and individuals have contributed to the development of society. The evolution of society is an appropriate focus for the application of creative problem solving skills. The sample objectives are sequentially delineated so that students may (1) consider difficulties inherent in individuals within groups developing and expressing unique ideas, (2) examine information regarding individuals from various groups who have made unique and significant contributions, (3) define problems relating to balancing pluralism and individualism in society, (4) generate ideas for assuring the encouragement of diversity of contributions to society by individuals and by groups, (5) set and use criteria for judging generated ideas, and (6) develop plans for gaining acceptance for selected ideas.

The area of focus that was selected in each content area was chosen because it includes an inherent "problem" or a potential problem to which the process may be applied. Educators should avoid attempting to apply the creative problem solving process to areas of study in which the "right answers" are already known (e.g., the study of subject and verb agreement in language arts, the calculation of the volume of a cube in mathematics, the molecular structure of water in science, and the names of state capitals in social studies).

CREATIVE PROBLEM SOLVING PROCESS

MESS-FINDING, STAGE #1: Mess-finding "involves probing our interests, experiences, and concerns to consider a number of general topics which might serve as possibilities or starting points for CPS." (Isaksen and Treffinger, 1985, p. 15)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to brainstorm many and varied traits that may distinguish romanticism from realism in prose and poetry and will record their ideas on the chalkboard.	In their study of American Romantic Era literature, students will be able to use what they have learned to specify positive and negative aspects of romanticism and will present their ideas in a list with a narrative.
MATHEMATICS	In their study of probability and statistics, students will be able to use what they have learned to list many possible reasons why people may wish to make predictions and will share their ideas in a list.	In their study of probability and statistics, students will be able to use what they have learned to collect case studies of predictions and will organize their findings in notes and share their findings through a class discussion.
SCIENCE	In their study of physics, students will be able to use what they have learned to brainstorm possible positive and negative consequences of using the scientific method (including the limitations and the consequences) and will share their ideas in a class discussion.	In their study of physics, students will be able to use what they have learned to examine ways in which scientists and philosophers have viewed mechanics over time and will present their findings using an outline.
SOCIAL STUDIES	In their study of American culture, students will be able to use what they have learned to brainstorm many possible consequences of an individual having a unique idea in a group. The students will record their ideas on a class list.	In their study of American culture, students will be able to use what they have learned to classify the specific positive and negative aspects of having a unique idea within a group. The students will mark their selections on a class list.

CREATIVE PROBLEM SOLVING PROCESS

DATA-FINDING, STAGE #2: Data-finding involves "gathering all available information, knowledge, facts, feelings, thoughts, opinions, or questions about the mess." (Isaksen and Treffinger, 1985, p. 15)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to brainstorm the impressions and reactions that they have had in reading selected pieces of literature and will record their ideas on a list.	In their study of American Romantic Era literature, students will be able to use what they have learned to collect and classify information on ways in which romanticism has influenced the western concept of individualism and will present their ideas in a series of notes.
MATHEMATICS	In their study of probability and statistics, students will be able to use what they have learned to generate both quantitative and qualitative criteria for distinguishing "success" from "failure" in making predictions and will share their ideas in a list.	In their study of probability and statistics, students will be able to use selected criteria to distinguish successful from unsuccessful studies that have made predictions and will present their conclusions in a report.
SCIENCE	In their study of physics, students will be able to use what they have learned to brainstorm unique alternatives to the presently accepted laws of physics and will present their ideas in a written theory, a series of illustrations, or a dramatization.	In their study of physics, students will be able to use what they have learned to collect and organize data about scientists who challenged existing laws of physics and will record their findings on note cards.
SOCIAL STUDIES	In their study of American culture, the students will be able to use what they have learned to brainstorm a list of individuals who have make significant contributions and will record the names on a class list.	In their study of American culture, the students will be able to use what they have learned to collect data on an individual who made an important, unique contributions and will record the information on note cards with sketches.

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CREATIVE PROBLEM SOLVING PROCESS

PROBLEM-FINDING, STAGE #3: Problem-finding involves "consider[ing] many possible questions, or 'problem statements,' about which [one wishes] to gather ideas." It also includes selecting "a problem statement, or a combination of problem statements that seem best to fit the most important aspects of the situation [or the mess] ..." (Isaksen and Treffinger, 1985, p. 15)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to generate possible problems (stated in broadest terms) relating to individuality in a structured society and will record their ideas in a list or in a series of sketches.	In their study of American Romantic Era literature, students will be able to use what they have learned to define the major problems relating to the practice of individualism in a structured society and will present their conclusions in a written statement.
MATHEMATICS	In their study of probability and statistics, students will be able to brainstorm a list of potential impediments to making accurate predictions and will record their ideas on a chart.	In their study of probability and statistics, students will be able to use what they have learned to identify the major impediments to making accurate predictions and will present their ideas through a list and a report.
SCIENCE	In their study of mechanics, the students will be able to use what they have learned to generate a list of many objections to a list of hypothetical laws of physics. They will present their ideas in a list and class discussion.	In their study of physics, students will be able to use what they have learned to specify the major obstacles in having a new theory accepted and will present their conclusions in a class discussion.
SOCIAL STUDIES	In their study of American culture, the students will be able to use what they have learned to think of many ways in which a group or a society may encourage or discourage individuals from making valuable contributions. Students will record their ideas on a flipchart.	In their study of American culture, the students will be able to use what they have learned to specify what, in the broadest sense, are the sources of harmony and of conflict in a pluralistic society. Students will present their ideas in self-selected product forms.

CREATIVE PROBLEM SOLVING PROCESS

IDEA-FINDING, STAGE #4: Idea-finding "involves searching for many possible responses or ideas for the question or problem statement selected in problem-finding." (Isaksen and Treffinger, 1985, p. 15)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to brainstorm many and varied ideas for balancing individuality with citizenship and will present their ideas in a list.	In their study of American Romantic Era literature, students will be able to use what they have learned to identify potentially useful ideas generated through the previous brainstorming activity. They will present their ideas in a revised list.
MATHEMATICS	In their study of probability and statistics, the students will be able to use what they have learned to brainstorm many and unique ways a researcher might assure accuracy of prediction and will present their ideas in a list or on a web.	In their study of probability and statistics, the students will be able to use what they have learned to select key ideas relating to making accurate predictions and will present their ideas in a revised list or on a revised web.
SCIENCE	In their study of physics, students will be able to use what they have learned to brainstorm many ideas for using a theory of physics to solve an energy problem and will share their ideas in a self-selected product.	In their study of physics, students will be able to use what they have learned to identify plausible and interesting ideas on the previously brainstormed list and will present their ideas on a chart and in a written proposal.
SOCIAL STUDIES	In their study of American culture, students will be able to use what they have learned to think of many ways in which society might encourage diversity of contributions while maintaining unity in structure. The students will present their ideas in a visual and a written format.	In their study of American culture, students will be able to use what they have learned to identify promising options in the ideas previously developed through the brainstorming session and will record their ideas on a flipchart.

CREATIVE PROBLEM SOLVING PROCESS

SOLUTION-FINDING, STAGE #5: Solution-finding involves "consider[ing] many possible criteria for evaluating ... promising ideas." It also includes choosing and applying the criteria in order "to determine which idea or ideas ... offer the greatest potential for solving the problem." (Isaksen and Treffinger, 1985, p. 17)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to generate many criteria that might be used to assess the options generated in the idea-finding stage of the creative problem solving activity.	In their study of American Romantic Era literature, students will be able to use what they have learned to select and use criteria to verify or dispute the assertion that "individuals challenge and affirm order" and will present their proof through a self-selected product form.
MATHEMATICS	In their study of probability and statistics, students will be able to use what they have learned to modify and elaborate on sample criteria for assessing ideas about making orderly predictions and will present their options in a list.	In their study of probability and statistics, students will be able to select and use criteria to judge guidelines that may be used for making orderly predictions and will present their ideas through a written product form.
SCIENCE	In their study of physics, students will be able to use what they have learned to generate criteria for assessing the previously generated ideas for solving an energy problem and will present their criteria in a checklist format.	In their study of physics, students will be able to use what they have learned to select and use criteria for judging and prioritizing the ideas regarding the solution of an energy problem. Students will present their conclusions in a matrix.
SOCIAL STUDIES	In their study of American culture, the students will be able to use what they have learned to generate criteria for assessing the ideas generated for encouraging and utilizing unique contributions by various groups. Students will record their ideas in a list.	In their study of American culture, the students will be able to use what they have learned to judge with criteria the ideas generated for encouraging contributions of various groups. Students will record their judgments on a matrix.

CREATIVE PROBLEM SOLVING PROCESS

ACCEPTANCE-FINDING, STAGE #6: Acceptance-finding involves "taking those promising problem-solving possibilities and considering the specific elements that will promote successful implementation." (Isaksen and Treffinger, 1985, p. 17)

	DIVERGENT PHASE	CONVERGENT PHASE
LANGUAGE ARTS	In their study of American Romantic Era literature, students will be able to use what they have learned to generate many ways for a person to maintain personal individuality while operating in and contributing to a structured society and will present their ideas in a list or in a written scenario.	In their study of American Romantic Era literature, students will be able to use what they have learned to develop a plan of action for implementing a self-selected initiative for making short-term and/or long-term individual contributions to self and society and will present their ideas through a set of goals and a time line.
MATHEMATICS	In their study of probability and statistics, students will be able to use what they have learned to list possible reasons why some people may avoid using the proposed guidelines for making orderly predictions and will share their ideas in a list and class discussion.	In their study of probability and statistics, students will be able to use what they have learned to develop a plan of action for gaining acceptance for the proposed guidelines on making orderly predictions. The students will present their ideas to other students through a class presentation supplemented with a visual product form.
SCIENCE	In their study of physics, students will be able to use what they have learned to list possible positive and negative effects of implementing the selected energy plan and will present their ideas in a list and panel discussion.	In their study of physics, students will be able to use what they have learned to develop a plan of action to convince a local, state, or national agency to accept the ideas for the new energy solution. Students will present their ideas in a written report with a time line and a graph.
SOCIAL STUDIES	In their study of American culture, the students will be able to use what they have learned to generate many and varied means for implementing the ideas selected through the solution-finding activity.	In their study of American culture, the students will be able to use what they have learned to develop a plan of action for gaining acceptance of a selected idea by the student council, the school administration, and the faculty members.

Creative Problem Solving: Single-Stage Applications

While the creative problem solving model is presented in a sequential format, it does not need to be used in this manner. Educators may use any stage or phase within a stage of the creative problem solving process with subject matter, providing that these prerequisites are met: (1) the students have sufficient knowledge of the subject matter so that they may use the process constructively; (2) the students have sufficient knowledge of and experience with the stage/phase so that they may apply the process successfully to the subject matter; (3) the product forms planned for the learning experience are sufficient for students to present their ideas.

Example: Language Arts
A language arts teacher might use the mess-finding stage to have students list, prior to writing a poem, the aspects of American Romantic Era literature that they did and did not enjoy.

Example: Mathematics
A mathematics teacher might have students use the solution-finding stage with their study of probability and statistics to set and use criteria in order to establish whether or not the requirements of "no systematic bias" have been met.

Example: Science
A science teacher might have students use the idea-finding stage with their study of laboratory procedures to generate many, varied, and unique ways to assure the safety of each student in the class.

Example: Social Studies
A social studies teacher might have students use the fact-finding stage to determine what information they already possess and what information they need regarding their study of American culture.

Even when the entire creative problem solving process is being utilized with a discipline, the process does not need to be used in order. One may always jump ahead or return to a stage, as needed. The creative problem solving process is composed of mental skills and tools that may be applied as needed to any area of study in which the outcomes will be productive.

Conclusion

The creative problem solving process provides a useful structure for organizing the study of some areas of subject matter or reinforcing specific elements within an area of subject matter. As an advanced organizer in curriculum planning, the creative problem solving process has specific strengths which include:

- providing continuity in the study of a topic;
- emphasizing the "interrelatedness" of the information within an area of study;
- allowing for the mastery of facts, the generation of ideas, and the judging of concepts;

- including a dimension of "open-endedness" that will allow students of varying abilities, interests, and backgrounds with opportunities to succeed in learning and using information;
- giving teachers opportunities to utilize varied instructional strategies in the delivery of information;
- providing students with opportunities to present their ideas through varied product forms.

Educators are encouraged to use the CPS process with the areas of study specified in the required curricula rather than with "made-up" content.

Background and Resources

The creative problem solving process was initially developed by Alex F. Osborn. In his book *Applied Imagination*, he presented many of the ideas that were later incorporated into the process. Sidney Parnes, Ruth Noller, and Angelo Biondi present the stages and steps of the creative problem solving process in their publications, *Creative Behavior Guidebook* (1967), *Creative Actionbook* (1976), and *Guide to Creative Action* (1977). In 1985, Scott Isaksen and Donald Treffinger developed the publication *Creative Problem Solving: The Basic Course*. This book provides a detailed, step-by-step guide to learning and using a revised and expanded version of the creative problem solving process.

Educators considering the use of the creative problem solving process are strongly encouraged by the authors to review the following publications:

Feldhusen, J.F. & Treffinger, D.J. (1980). *Creative Thinking and Problem Solving in Gifted Education*. Dubuque, IA: Kendall/Hunt.

Isaksen, S.G. & Treffinger, D.J. (1985). *Creative Problem Solving: The Basic Course*. Buffalo, N.Y.: Bearly Limited.

Torrance, E.P. & Safter, H.T. (1990). *The incubation model of teaching*. Buffalo, NY: Bearly Limited.

Notes:

SECTION III:

PRODUCT

DIFFERENTIATION

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INTRODUCTION

Products are vehicles by which students consolidate learning and communicate ideas. When a student creates kinesthetic, oral, visual, and written products, information is "reconstructed" or "personalized" for the learner. When a student presents a product to others, ideas are communicated and student progress may be evaluated.

The product dimension of curriculum is a significant consideration in working with all learners. Students will benefit from a focused approach to product instruction in that they will have opportunities for continuous progress with regard to communication skills, they will have opportunities for selecting products that demonstrate individual areas of ability, and they will gain skills of self-critique that will foster autonomous growth. When educators promote curricular diversity and student autonomy, they increase the likelihood of motivating students to learn.

Gifted learners are especially well-suited to a focused approach of product instruction, as the goals of instruction are "fitted" or "matched" to the intellectual traits of intellectually able students. Because gifted learners process information with greater intensity than their age peers, product forms require greater sophistication and diversity. The products developed by intellectually able students must have the capacity to communicate complex ideas effectively . If gifted learners are to assume the role of "intellectual leaders," they must have the ability to communicate their ideas effectively to varied audiences.

The following pages provide guidelines and sample materials that foster creative production in high school classrooms. The goals for encouraging creative production which follow support intellectual traits that distinguish gifted learners from their age peers. Each goal is followed by several teaching strategies to be used with gifted high school students. The strategies are complemented by sample materials intended to enhance instruction and management. The reader is encouraged to adapt selected strategies and materials to match the learning environment in which they will be planned and implemented.

GOALS FOR ENCOURAGING CREATIVE PRODUCTION

The following goals are recommended for encouraging creative production in high school classrooms and in special grouping arrangements for gifted learners. The goals respond to the intellectual traits of gifted learners.

Goal I: Encourage Multiple Modes of Expression

Goal II: Guide Self-Selection

Goal III: Provide Direct Instruction

Goal IV: Foster Effective Means of Evaluation

Goal V: Support Continuous Progress

GOAL I: ENCOURAGE MULTIPLE MODES OF EXPRESSION

The intellectual traits of gifted learners suggest that they will benefit by engaging in multiple modes of expression. Their ability to learn rapidly suggests that they will have time to explore many product options. Their intense and sophisticated interests indicate that they will have the desire and the need to become proficient in various forms of expression. Several strategies support this goal.

Strategy A: Display a Product List

Displaying a product list in the classroom is one method by which educators encourage students to diversify their communication skills. Alphabetized lists remind students and teachers to consider many product possibilities. A product list that is categorized by modality (i.e., kinesthetic, oral, visual, and written) promotes awareness on the part of teachers and students that individuals sometimes have preferred methods of manipulating and communicating ideas. Teachers and students gain insights into their intellectual preferences. Strengths may then be highlighted and deficits may be addressed.

Product Possibilities	
Kinesthetic	**Oral**
demonstration diorama display dramatization experiment mobile model relief map	audio tape recording conference presentation debate documentary lecture mock interview radio/television commentary speech
Visual	**Written**
brochure bullet chart cross-section flowchart graph information table poster time line	booklet critique dictionary essay journal magazine article newspaper article profile

Strategy B: Develop the Student's Preferred Modality

As educators become increasingly aware of student strengths, they are better able to foster continuous progress. A student who presents ideas well in writing will advance in this area when presented with more sophisticated writing strategies and more diverse written product options. Educators may present students with increasingly complex product descriptors for one written product (see below), and they may also present students with a greater selection of written products from which to choose (see Varied Written Products on the next page). Educators may approach each modality in a similar fashion, that is, by determining and building upon an area of student ability.

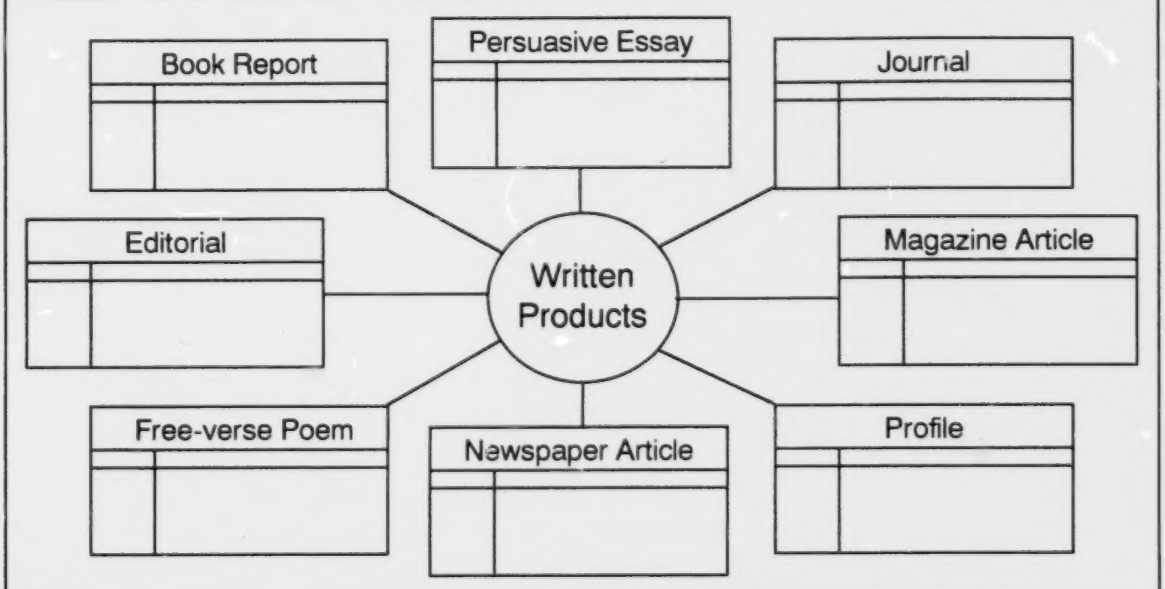
Persuasive Essay I – written	
Parts	Attributes
thesis statement	at beginning and/or end, clear position taken, logical
voice	third person
points of agreement	established immediately, logical
issues	stated clearly, supported with example, refutes opposing arguments
conclusion	call to action, asks for acceptance of belief/position

Persuasive Essay II – written	
Parts	Attributes
thesis statement	at beginning and/or end, clear position taken, straightforward language, stated completely, logical
voice	third person, targets intended audience, issue-based
points of agreement	established immediately, emotion/logic-based
issues	stated clearly, supported with examples/statistics, refutes opposing arguments, subtle emotional appeal, transition statements as links
conclusion	call to action, asks for acceptance of belief/position, re-establishes points of agreement, (re)states thesis

Persuasive Essay III – written

Parts	Attributes
topic	debatable, relevant and significant to intended audience
thesis statement	at beginning and/or end, clear position taken, straightforward language, stated completely, logical, potentially acceptable to intended audience
voice	third person, targets intended audience, issue-based
points of agreement	established immediately, emotion/logic/philisophical-base, most significant agreements depicted first
issues	stated clearly, supported with examples/statistics/cause-effect relationships/metaphors, refutes opposing arguments, subtle emotional appeal, transition statements as links, ordered from most to least acceptable
conclusion	call to action, asks for acceptance of belief/position, re-establishes points of agreement, (re)states thesis

Varied Written Products



Strategy C: Build Positive Associations Across Modalities

When educators are aware of student preferences they are better able to help students build upon their strengths. A student who has expertise in writing may be encouraged to develop skills of oral presentation if allowed to write the presentation and read it to others. Once the student has perceived success at reading to others, the student might present from an outline. Eventually, the student may be sufficiently accomplished in skills of oral presentation to engage in panel discussions, debates, and speeches. The principle of developing positive associations may be used by engaging a student in the student's preferred modality while including a "low risk" encounter with a less-developed modality. Factors that may influence the level of risk include the size of the audience, the length of time, and the focus on grading.

GOAL II: GUIDE SELF-SELECTION

Several intellectual traits of gifted learners suggest that skills of self-selection be developed. Many gifted students are highly curious and are interested in examining curricular choices. Their skills of critical thinking indicate that curricular decision-making can be shared between teacher and student. Several strategies support this goal.

Strategy A: Use Self-Selection When Appropriate

Providing students with opportunities to self-select a product form is appropriate in various situations. It would be inefficient for teachers to provide this option to students too often. Several conditions that support student choice include the following: (1) self-selection of product is most appropriate after long-term studies, as long-term topics warrant long-term production, and (2) self-selection of products is most appropriate when higher-level thinking skills are infused in the learning activity, as these activities generally involve sophisticated concepts requiring complex products. When learning activities involve short-term studies and basic levels of thinking, teacher-prescribed products are warranted. (See sample lesson plans in Section V.)

Strategy B: Support Increasing Levels of Autonomy

Supporting student autonomy involves gradual phases (see below). Students will be better able to engage in curricular decision making after the teacher explains how an experienced educator makes choices. Three steps to developing student autonomy are:

Teacher Prescribed Products

When the teacher prescribes a product, a rationale for that product choice should be presented to the class. For example, the teacher might explain that a tree chart was selected because it visually demonstrates how ideas are related hierarchically (or "nested"). In another activity, a teacher might explain that a given activity will culminate in students creating time lines, because time lines present

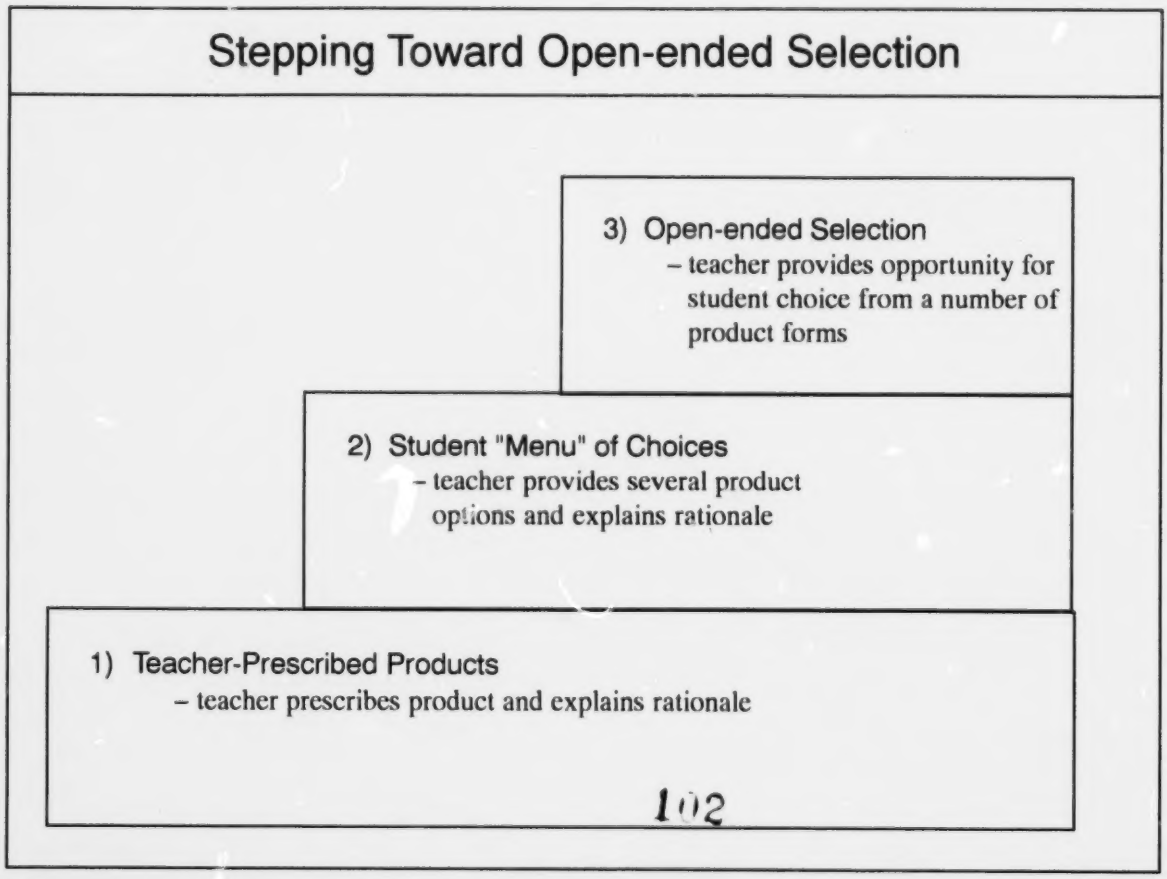
a sequential listing of events in a way that allows the viewer to see and compare rates of events. Explaining why a given product was selected will help students to improve their skills of product selection.

Student "Menu" of Choices

When students appear ready, a teacher may offer a limited range of product choices, preferably in several modalities. In a learning activity that involves a sequential presentation of events, a teacher might explain to students that their product choices include a time line (visual), an essay (written), a presentation (oral), and a model (kinesthetic). Each of these product choices has the capacity to show a sequential listing of events. Again, it is helpful if the teacher provides a rationale for the product choices.

Open-ended Selection

When a student becomes proficient in selecting product forms from a limited menu of product choices, the teacher may provide opportunities for open-ended selection. Open-ended selection involves a student choosing from a large sampling of products (see Product Possibilities, p. 100). That student might also have an opportunity to combine various product forms or to invent a new one.


Stepping Toward Open-ended Selection
3) Open-ended Selection
– teacher provides opportunity for student choice from a number of product forms
2) Student "Menu" of Choices
– teacher provides several product options and explains rationale
1) Teacher-Prescribed Products
– teacher prescribes product and explains rationale

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Strategy C: Set and Use Selection Criteria

A teacher may assist students in setting and applying criteria to support successful selection of products. Displaying product selection criteria in the classroom (see Product Selection, p. 106), perhaps next to a list of product possibilities (see p. 100), will help the teacher and the students in matching products to selected learning activities. A list of possible selection criteria follow.

Interesting for the Learner

Student preference is a valid selection criterion. Interest-driven decisions foster intense interactions with materials and subject matter. A student who feels enthusiasm and who perceives potential benefits from a given product form is likely to engage in the learning activity more intensely.

Challenging for the Learner

Students should be encouraged to select product forms that challenge them to make continuing progress. This criterion is met when students select a product form that is new to them. It is also met when students produce a more complex variation of a product that they have previously developed.

Matched to the Content

To be effective, a product must have the capacity to communicate the selected content. Factors that might influence how well a product matches the content include (1) structural factors, such as the degree to which the information is linear, hierarchical, or global in nature; (2) quantitative factors, the degree to which the product has the capacity for the necessary quantity of information; and (3) emotional factors, the degree to which the product can convey the "feeling" of the selected content.

Matched to the Audience

To ensure effective communication, a student must consider the audience in selecting a product. In considering the nature of the audience, a student might ask the following questions: (1) Will the audience be able to interpret or understand this type of product? (2) Will the audience be curious about, attracted to, or enjoy this type of product adequately? (3) Will the audience be able to see, hear, or otherwise interact with the product? In most school situations, the audience for student products is limited to a predetermined individual or group (i.e., the teacher or the class). Therefore, the student is concerned less with selecting an audience that might appreciate interacting with the information than with matching the product to the selected audience.

Realistic

In selecting a product type, the learner must assess available resources. Resources that effect successful product development include (1) time with respect to scheduled work periods and due dates; (2) available materials for developing the product; (3) necessary assistance from various individuals; (4) reference materials; and (5) requisite skills and background knowledge. By assessing necessary provisions before product development begins, a student increases the likelihood of successful outcomes.

Product Selection

Interesting for the Learner

- Are you enthusiastic about developing this type of product?
- Do you have something to gain by developing this type of product?

Challenging for the Learner

- Is this the product form relatively new to you?
- If you have produced in this format before, how will this version be more complex than before?

Matched to the Content

- Does this product form have the structural format (e.g., linear, hierarchical, global) to support your topic?
- Does this product form have the capacity to present the quantity of information regarding your topic?
- Does this product form have the potential to convey emotional factors related to your topic?

Matched to the Audience

- Will the audience be able to interpret or understand this type of product?
- Will the audience be curious about, attracted to, or enjoy this type of product?
- Will the audience be able to see, hear, or otherwise interact adequately with the product?

Realistic

- Do you have sufficient work time to develop this type of product?
- Can you obtain the materials necessary for developing this type of product?
- Will you be able to acquire the necessary assistance for developing this type of product?
- Can you obtain the necessary reference materials for developing this type of product?
- Do you have the requisite skills or background experience to develop this type of product?

GOAL III: PROVIDE DIRECT INSTRUCTION

Several intellectual traits of gifted learners suggest that teachers should provide direct instruction on developing complex products. Many gifted students are able to think in a highly analytical manner. They perceive fine differences and abstract relationships and are very capable of conceiving sophisticated products. Their ability to manipulate abstract information will be augmented through an ability to communicate effectively through complex methods and means of communication. Several strategies support this goal.

Strategy A: Highlight Exemplary Products

Exemplary products appear in many varied sources. The media-rich society of the 1990s is a marketplace of kinesthetic, oral, visual, and written work samples. Collecting exemplary work samples from the media provides educators with materials for students to analyze. Photocopying written and visual products, videotaping oral and kinesthetic products, and audio-taping oral products are ways to collect sample works for students to critique. When students view ways in which working professionals apply insets in charts, logic in debates, sequential steps in experiments, and closing statements in editorials and speeches, they learn new strategies to extend their communication skills. As students critique work samples, the teacher can record student comments to develop lists of standards. A sample critique follows.

Product Critique		
Product Type: Chart with Pie Graph	**Modality:** Visual	**Source:** Tone Magazine, 10/91
Special Features: pie chart appears three-dimensional; one pie section highlighted by use of color; title is bold-faced and in a shaded box; negative space around boundary; brief introductory statement appears under title; inset depicts important details/concepts; narrative sections offer concise descriptions of the major concepts; narrative sections are boxed and numbered in the order to be read; brief summary capsulizes main idea.		

Strategy B: Delineate Product Expectations

Product descriptors (see pp. 108-109) are instructional resources that help teachers (1) record essential information about various products; (2) communicate to students essential information about various products; and (3) delineate expectations for evaluation. Teachers develop product descriptors by creating a working draft of a product that they have familiarity with, extending the working draft by reviewing available samples, and refining the working draft based on student outcomes. Descriptors may be used by teachers during direct instruction and by students who are developing products (possibly self-selected) on their own. Product descriptors may be displayed with product lists and product selection criteria for individual use.

Diorama – kinesthetic	
Parts	**Attributes**
title	prominent, concise, summarizes, visible from front
objects	realistic color/shape/features, proportion, 3-D, movement, visual direction, secured
text	explains key points, visual direction, limited
container	adequate size, sturdy, one or more openings for viewing, supportive or neutral design, attachments
interior	supportive or neutral design, detailed bottom surface
credits	discrete, alphabetized, visible from front
negative space	surrounds all text, graphics, and objects

Report – oral	
Parts	**Attributes**
introduction	speaker introduced, topic described, impetus for project explained, project outline reviewed, expected outcomes discussed
beginning	topic described in general terms, major point outlined/emphasized, audience involvement
body/middle	major points supported with details/statistics/examples, intermittent summarizations, transition statements link major points, audience involved with content
body language	sustained eye contact with audience, formal posture, natural gestures/expressions, clear and well-paced voice
use of products	to support major points, intermittent use, limited
summary	major points reviewed, call to action/ask for acceptance of the concepts/beliefs/positions

Time Line – visual	
Parts	**Attributes**
title	prominent, concise, summarizes
line	ruled, may represent topic, arrowed
time increments	uniform size per unit of time, clearly visible, equal intervals, sub-units of time for important events
labels	printed legibly, uniform size, represent key events
illustrations	limited, highlight key events/concepts
background	non-obtrusive, may support main concept
credits	discrete, alphabetized, visible from front
negative space	surrounds text, graphics, and boundary of product

Research Report – written	
Parts	**Attributes**
introduction	describes the challenge, explains why the investigation was conducted, explains the significance of the study, speculates upon potential uses for the findings
body	short simple sentences, organized by subtopics, frequent subheadings, subtopics linked by transition statements, jargon-free, objective lan guage
discussion	summarization of important, relevant data
conclusion	brief, supported by evidence, not exaggerated
references	complete bibliographic data, consistent format, APA or district-specific guidelines

Strategy C: Infuse Product Instruction With Core Activities

Traditional instructional activities often exclude the product dimension of curriculum. Product instruction can assume a significant role in the curriculum in a time-efficient manner. (See sample lesson plans in Section V and see below.)

During the product-oriented segment of the lesson, the teacher may find it helpful to articulate three aspects of instruction (see below, Instructional Activity # 3), as follows: (a) Instructional Objective - The teacher introduces, reviews, or extends student knowledge of the selected product; (b) Instructional Strategy — The teacher describes, discusses, and/or displays the selected product; (c) The Instructional Resource — The teacher uses product descriptors, copies of exemplary work samples, or reference books that relate to the selected product. (Also see lesson plans in Section V.)

Lesson Plan Structure

Dimensions of Curriculum:

Content: Process:
Product: Research Skill:

Learning Objective:

In their study of the content students will process and share their ideas using a product.

Instructional Activities:

The teacher will:

1. direct instruction of Content: Instructional Objective(s) • Strategy(ies) • Resource(s)
2. direct instruction of Process: Instructional Objective(s) • Strategy(ies) • Resource(s)
3. √ direct instruction of Product: Instructional Objective(s) • Strategy(ies) • Resource(s)
4. explanation/listing of evaluation criteria
5. closure of lesson

Materials:

Environment:

Principle of Differentiation:

GOAL IV: FOSTER EFFECTIVE EVALUATION

Detailed critique is particularly well-suited to gifted learners because of their analytical nature. Several strategies support this goal.

Strategy A: Establish Specific Criteria

It is important to consider several types of criteria when critiquing student activities, including (1) product-related criteria and (2) content-related criteria. Product-related criteria reflect communication skills/strategies as indicated by product descriptors (see sample product descriptors, pp. 108-109). Content-related criteria involve the information for which students are responsible, most commonly associated with products such as tests and quizzes.

Teachers can differentiate the curriculum by providing product options to students. When doing so, equitable evaluation can be addressed by holding the content-related criteria constant for all students, while varying product-related criteria based on their product choices (see Critiquing Multi-Product Activities, p. 112).

Strategy B: Apply Guidelines of Effective Evaluation

Educators may enhance student outcomes by adhering to several evaluation guidelines. First, it is important to communicate clear and complete standards (see Strategy A, above). Second, evaluation should be based on the standards established prior to the activity. Third, feedback should be delivered after the task is completed. When clear and complete standards are communicated to students prior to an activity, evaluation becomes more meaningful.

Strategy C: Engage Students in Guided Self-Critique

When clear production standards are established, students are able to critique their own progress. To develop students' skills of autonomous learning, teachers can share the responsibility of evaluation. Through self-critique, students learn to guide their own progress. One way to manage self-critique is through self-rating sheets (see Self-Rating Form, p. 113). Teachers can maintain a supply of blank rating sheets and assist students in establishing content-related and product-related criteria prior to an activity.

Critiquing Multi-Product Activities

Activity

Students will review the novel *Huckleberry Finn* to determine the five most significant lessons that Huck learned about life. They will share their findings through (1) a mobile, (2) an oral report, (3) a time line, or (4) an essay.

Content Critique

Include five or more major lessons.
Rank them in order of potential impact on Huck's life.
Justify why they were *major* lessons.
Explain who was responsible for each learning experience.

Product Critique

Mobile: Kinesthetic

title section: most prominent part of mobile, concise, summarizes, subsumes main ideas, may visually represent topic, legible from floor, multiple viewing points, rigid

main topics: related to title, parallel structure, represent title completely, multiple viewing points, rigid, spread to three diminsions, legible from floor

subtopics: related to main topics, parallel structure, represent main topics completely, legible from floor, multiple viewing points, rigid

cross-supports: rigid, unobtrusive, balanced, allows free rotation

line: unobtrusive, well-secured

Report: Oral

introduction: speaker introduced, topic described, impetus for project explained, project outline reviewed, expected outcomes discussed

beginning: topic described in general terms, major point outlined/emphasized, audience involvement

body: major points supported with details/statistics/examples, intermittent summarizations, transition statements link major points, audience involved with content

body language: sustained eye contact with audience, formal posture, natural gestures/expressions, clear/well-paced voice

use of products: to support major points, intermittent use, limited

summary: major points reviewed, call to action/ask for acceptance of the concepts/beliefs/positions

Time Line: Visual

title: prominent, concise, summarizes

line: ruled, may represent topic, arrowed

time increments: uniform size per unit of time, clearly visible, equal intervals, sub-units of time for important events

labels: printed legibly, uniform size, represent key events

illustrations: limited, highlight key events/concepts

background: non-obtrusive, may support main concept

credits: discrete, alphabetized, visible from front

negative space: surrounds text, graphics, and boundary of product

Essay: Written

introduction: explains the challenge/question(s), describes the organizational structure of the essay

paragraphs: narrow subject, precise topic sentence, sentences support topic sentence with details, supporting statements linked via transistion statements, concluding statement

body: follows organizational structure depicted in introduction, shows command of subject matter through references to supportive data — including specific names/dates/events/etc., transition statements link paragraphs, creates mental/sensory images, maintains focus, responds to challenge/question(s) in precise terms

conclusion: restates the challenge/questions, summarizes major points of essay

Self-Rating Form

Name: _____ Date: _____
Course: _____ Topic: _____
Period: _____ Product(s): _____

Criteria	N/A	NSH	G	VG	GRT

GOAL V: SUPPORT CONTINUOUS PROGRESS

Most gifted learners learn rapidly, are highly curious, and are often very intense in their pursuit of skills and knowledge. Supporting continuous progress through various management strategies is therefore an essential goal. Several strategies that support this goal are as follows:

Strategy A: Provide Essential Resources

Resource-rich learning environments support complex outcomes. Establishing a resource-rich learning environment involves several considerations, including (1) providing resources to the degree that the school is able and (2) ensuring that available/existing resources are easily accessible to students. Suggested categories of resources are:

Materials
Accessible drawing/painting supplies; posterboard, cellophane, overhead transparencies; and supplies for cutting, measuring, and tracing.

Information Sources
Product descriptors, "how to" books, and trade magazines assist students in maintaining continuous progress.

Experts
In-house and community-based mentors provide students with guidance and expertise via written, telephone, and/or personal contact. Cataloging available mentors is one way of maintaining access.

Technological Tools
Computers, scanners, printers, photocopiers, cameras, video equipment, recorders and the like exist in many school districts. Establishing accessibility to technological tools is a desirable goal.

Strategy B: Foster Non-fragmented Growth

A spectrum of abilities exists in all learning environments, even in situations involving ability grouping. It is necessary to have a range of expectations for students so that all students can make gains commensurate with their abilities.

To respond to this range of abilities teachers can differentiate the product dimension of curriculum by making product descriptors at varying levels available to students. (See Oral Presentation I, II, and III, pp. 115-116) In doing so, students are able to select a level or proficiency to work toward. A student with great expertise in presenting ideas to others orally will be guided to improve through a more challenging range of expectations, while a student who is less accomplished in this area would be guided toward achieving at levels that are appropriately matched to the student's readiness level. Another way to foster continuous academic growth is to have students maintain product portfolios.

Product portfolios may contain actual products, copies of products, or photographs of products. Work samples such as these may be accompanied by rating sheets (see Self-Rating Form, p. 113). A student profile may prove useful in tracking student progress over time (see Student Profile, p. 116). Product portfolios are especially useful in a departmentalized learning environment, because they enable educators to see a "well rounded" sampling of academic accomplishments.

Oral Presentation I – oral	
Parts	**Attributes**
introduction	speaker introduced, impetus for project explained
beginning	topic described in general terms, major point outlined/emphasized, audience involved
body	major points supported with details/examples
body language	sustained eye contact with audience, formal posture, natural gestures/ expressions, clear and well-paced voice
use of products	to support major points, limited
summary	major points reviewed

Oral Presentation II – oral	
Parts	**Attributes**
introduction	speaker introduced, topic described, impetus for project explained, project outline reviewed
beginning	topic described in general terms, major point outlined/emphasized
body	major points supported with details/statistics/examples, intermittent summarizations, audience involved with content
body language	sustained eye contact with audience, formal posture, natural gestures/ expressions, clear and well-paced voice
use of products	to support major points, limited
summary	major points reviewed, call to action/ask for acceptance of concepts/beliefs/ positions

Oral Presentation III – oral

Parts	Attributes
introduction	speaker introduced, topic described, impetus for project explained, project outline reviewed, expected outcomes discussed
beginning	topic described in general terms, major point outlined/emphasized, audience involved
body	major points supported with details/statistics/examples, intermittent summaries, transition statements link major points, audience involved with content
body language	sustained eye contact with audience, formal posture, natural gestures/expressions, clear and well-paced voice
use of products	to support major points, intermittent use, limited
summary	major points reviewed, call to action/ask for acceptance of concepts/beliefs/positions

Student Profile

Date	Course	Product Type	#	Modality	Rating

Strategy C: Maintain A Product Scope and Sequence

In order to provide continuity of instruction, the Texas Education Agency requires each school district to maintain a scope and sequence of products for gifted learners. A product scope and sequence at the high school level is most effective when articulated in terms of the disciplines through which students receive instruction. In fact, it seems most advisable for each department to determine which product forms are essential in that discipline and then match the products to specific courses. If a scope and sequence is to drive instruction, it must complement the management structure in place. In the case of most high schools, this may translate into a departmentalized (and possibly a course-by-course) approach.

Another structural factor to consider in designing a product scope and sequence is balance among modalities of expression: kinesthetic, oral, visual, and written. To strive for balance within each discipline might impose incongruous/artificial standards upon teachers and students. It would be advisable, however, to strive for balance in terms of each year of high school. In other words, each freshman, sophomore, junior, and senior would receive direct instruction in all four modalities as a result of his/her total schedule of courses.

Another factor to consider when designing a product scope and sequence is the level of complexity regarding each product type (see Oral Presentation I, II, and III, pp. 115-116). Cross-referencing specific levels of product descriptors to various grade levels provides a clearly articulated set of expectations for teachers and students alike. This practice may promote continuity of instruction.

Common sense dictates that one should not impose unrealistic expectations upon any group of learners. A child's giftedness does not indicate across-the-board giftedness. Gradually moving students through a range of readiness levels will be much more effective than holding the same standards for all identified students. Each teacher must be prepared to upgrade and downgrade expectations based on individual student needs. In terms of the product dimension of curriculum, this will entail being prepared to articulate various levels of product expectations, perhaps through varying levels of product descriptors.

In order to develop a product scope and sequence, one might consider the following steps:

1. Determine (and list) the products that are essential for gifted learners in each discipline. Criteria influencing decision-making might include (a) traditional expectations in each discipline, (b) college expectations in each discipline, and (3) professional expectations for graduates of each discipline.

2. Articulate the product lists from each discipline in terms of specific subjects/courses.

3. Merge product lists from each discipline to create one overall list per grade level. Criteria that might influence this activity include (a) balance among modalities and (b) limited repetition.

4. Merge product lists across grade levels and specify the product types to be taught at each grade level and the level of complexity for each product.

Product Scope and Sequence

		freshman	sophomore	junior	senior
Language Arts	kinesthetic				
	oral				
	visual				
	written				
Mathematics	kinesthetic				
	oral				
	visual				
	written				
Science	kinesthetic				
	oral				
	visual				
	written				
Social Studies	kinesthetic				
	oral				
	visual				
	written				

Notes:

Notes:

SECTION IV:

INDEPENDENT

STUDY

SKILLS

Version 3.2

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INTRODUCTION

Independent study involves skills that enable learners to gather and manipulate information and to communicate the results to others. Skills of independent study may be taught in large-group situations (e.g., whole class), to small groups of students, or to one student at a time. The skills should be taught and practiced with guidance to ensure that students are able to pursue independent study projects on their own.

Skills of independent study are especially well-matched to the intellectual abilities of gifted learners. Independent study skills afford gifted learners (who are able to learn and memorize information rapidly) the opportunity to learn at rates commensurate with their own abilities. The skills also provide gifted learners (who have a wide range of interests) with strategies to pursue topics of genuine interest. Gifted learners who are adept at problem-solving and reasoning can apply their abilities to independent investigations as they recognize cause-effect relationships, set and use criteria to make judgements, and analyze concepts and situations. Skills of independent study are essential to gifted learners who must be able to access and manipulate information in order to excel and make significant contributions.

The suggested sequence of stages that follows is intended as a framework for educators and students. It provides a structure which is easily adapted by educators and is easily communicated to students. A well-articulated framework will help students to gain skills of independent study so that they may successfully engage in investigations of their own.

Educators should be flexible in implementing a sequenced model, however, because "real" investigations do not usually proceed along a predetermined course. A sequenced model is useful in providing students with a general "game plan," but it must remain flexible enough to meet the conditions of each individual pursuit. As students become increasingly proficient with their investigations, they should be encouraged to develop methods of pursuit that best suit them. Differing methods of investigation should be supported to the degree that they are successful. Catering to the specialized needs and abilities of each individual underscores successful implementation of this program.

How To Use This Section

This section of the curriculum guide begins with suggested guidelines that assist in the development and implementation of an independent study skills program. The guidelines are followed by a list of suggested stages of independent study. School districts are encouraged to adapt the guidelines and stages to be responsive to local conditions and goals.

Following the guidelines and suggested stages, each stage appears within a repeating structure. Each stage of independent study includes (1) a planning sheet with objectives and possible activities; (2) a brief explanation of each activity with a sample instructional resource to be used by students; and (3) a cooperative review form. Educators are encouraged to modify the objectives, activities, and review forms as the model is "shaped" to support local goals.

SUGGESTED GUIDELINES FOR INDEPENDENT STUDY PROGRAMS

The following guidelines serve as recommendations for establishing, maintaining, and implementing an independent study program. The guidelines are:

1. Skills of independent study are appropriately introduced through "whole group" instruction.

2. Fostering skills of independent study through direct instruction is initially the primary focus of the program.

3. Content acquisition becomes a key goal, after independent study skills are mastered.

4. Objectives and possible activities are clearly delineated to students.

5. Instructional materials that describe stages, objectives, and possible activities are available to students wishing to pursue independent study "on their own."

6. Each stage of independent study is small enough to ensure successful completion.

7. Student progress is evaluated at each stage through key objectives.

8. Self-selection of the topic is key to student success.

9. An established set of skills will facilitate continuity among grade levels and disciplines.

10. An independent study model will serve as a foundation for students wishing to develop diverse methods of investigation.

SUGGESTED STAGES OF INDEPENDENT STUDY

Below is a list of stages for an independent study program. Each stage serves as a temporary "stepping stone" for students wishing to conduct investigations. Educators are encouraged to adapt the stages to reflect the learning conditions and goals within their educational communities. The stages are:

Stage I: Select a Topic

Stage II: State a Challenge

Stage III: Develop a Plan

Stage IV: Gather Information

Stage V: Organize Information

Stage VI: Report the Findings

STAGE I: SELECT A TOPIC

Stage I of independent study is for those students wishing to (1) consider many, varied topics for possible study; (2) organize existing knowledge related to selected topics of interest; (3) explore information related to selected topics of interest; and/or (4) select a topic of genuine interest for further study. If a topic has already been selected, this stage should be omitted. A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

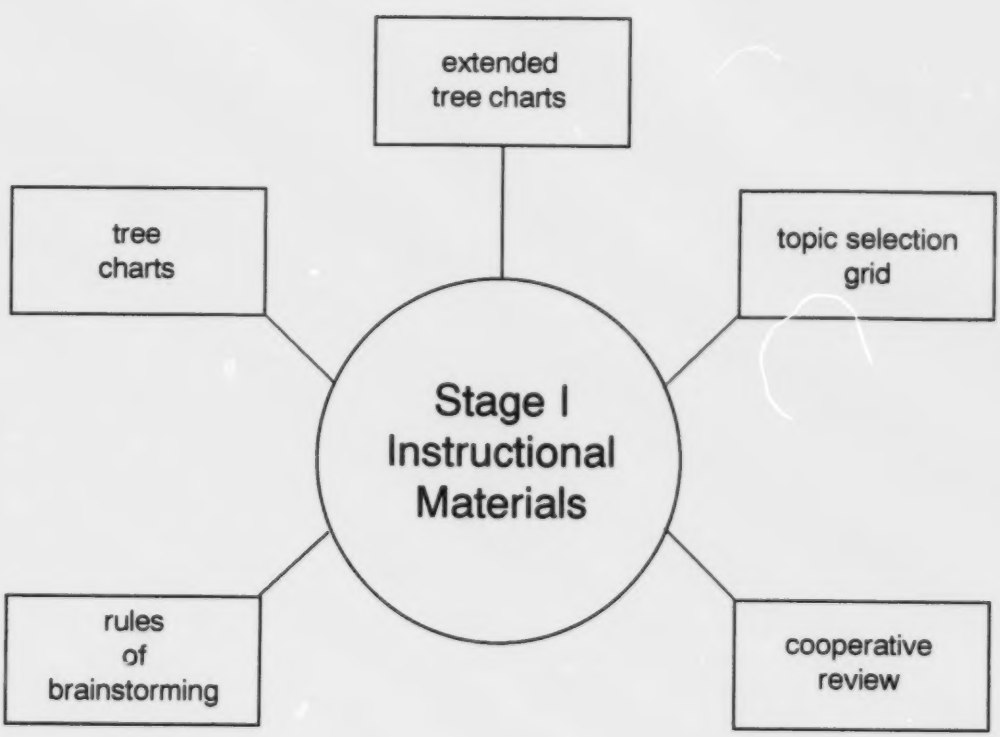
Stage I Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage I	by reviewing *instructional materials* available for Stage I
to consider many, varied topics for possible study	by applying the *rules of brainstorming* in a small-group or individual setting
to organize existing knowledge related to selected topics of interest	by constructing *tree charts* of existing knowledge about the selected topics
to explore information related to selected topics of interest	by consulting several available resources and extending the *tree charts* of existing knowledge
to select a topic of genuine interest for further study	by establishing and/or applying criteria via a *topic selection grid*
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage I: Activity A

Activity A will help students to develop an understanding of the objectives and activities for Stage I of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to review instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage I before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	I, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage I: Activity B

Brainstorming is a process by which individuals generate a large quantity of ideas. While brainstorming, individuals should focus on *quantity* -- not *quality*. Increasing the quantity of ideas available at the start of a project will increase the likelihood of arriving at several ideas of quality. Students should be aware of when to use skills of creative thinking and when to use skills of critical thinking. When looking for "good" ideas, it is best to generate "many" ideas first. Searching for ideas with merit through the use of critical assessment will be accomplished more efficiently after a sampling of many ideas are available from which to select. In this activity, students are to generate many, varied topics for possible study.

Rules Of Brainstorming | I, B

When beginning a project, it is best to start out with a large quantity of ideas. Having *many* ideas increases the likelihood of having several very *good* ideas. Apply the Rules Of Brainstorming as you generate *many* possible topics to pursue through independent study. The rules are:

Avoid all criticism and judgment.

This will help you to free your mind to develop lots of ideas.

Generate as many ideas as possible.

Quantity is the goal of brainstorming.

Zany, wild, silly ideas are welcome.

Zany ideas will open up new avenues of thought for more ideas.

Combine ideas and take off on the ideas of others.

There is no such thing as "cheating" while brainstorming. Build on the ideas of others, even when your responses are very similar.

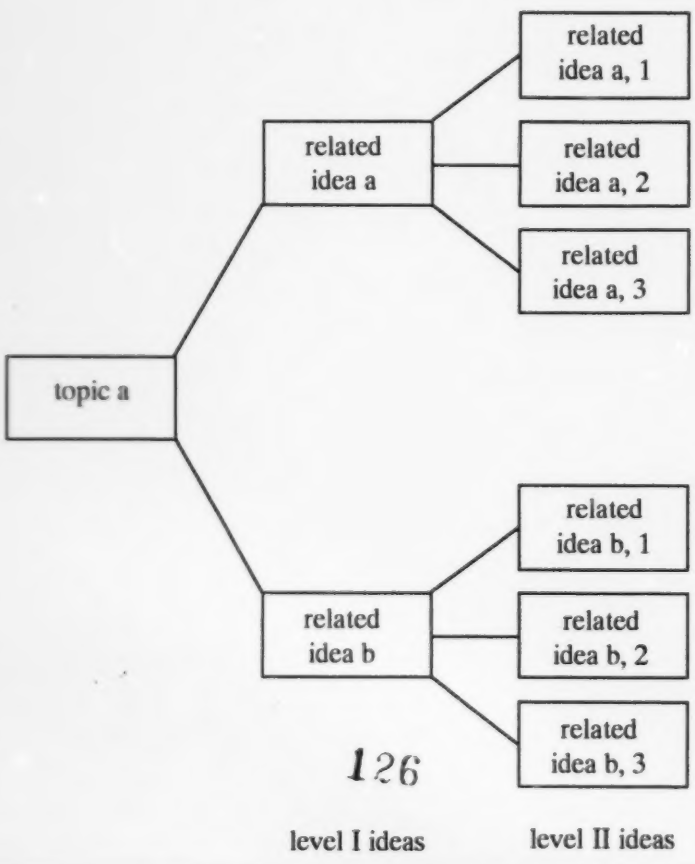
adapted from: D. Treffinger (1980)

Stage I: Activity C

Graphic organizers allow students to structure information visually. By mapping out information in a tree chart, students develop an awareness of what they already know about a given topic, and they are able to determine relationships among the various segments of information. Activity C asks students to organize their existing knowledge in regard to several of their most promising topics generated in Activity B.

Tree Chart	I, C

Use tree charts to map out your existing knowledge in several of the more promising topics that you generated in Activity B. This will help you to determine what you already know about several topics, it will help you to see relationships among ideas, and it will allow you to see areas of knowledge that you may wish to develop. Starter phrases for level I ideas include: "how it works," "its environment," "its stages," "beliefs about it," "its features," and "its uses." Of course, there are many others.



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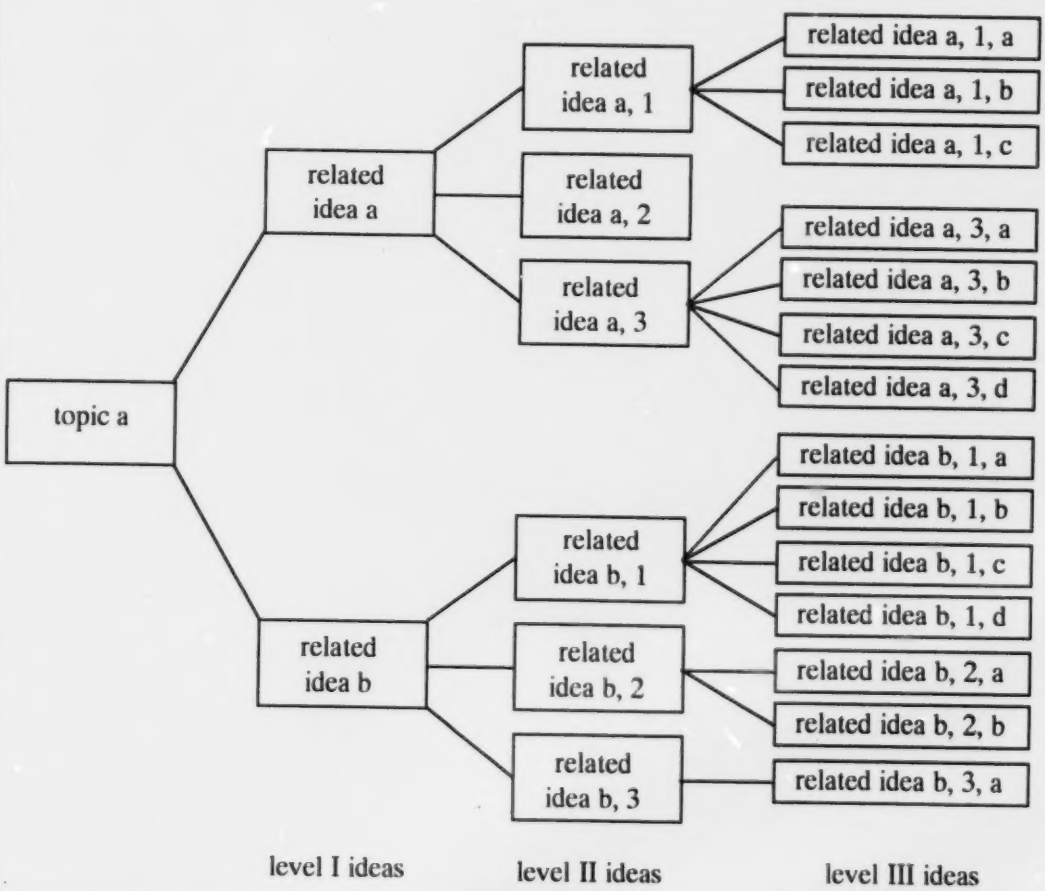
Stage I: Activity D

In Activity D, students are asked to consult several available sources of information to extend their knowledge about their more promising topics and to extend the tree charts which they developed in Activity C by adding new information. This activity involves general exploration and affords students an opportunity to investigate several topics before they commit to following up on any one of them. Students are to investigate selected topics informally through collection methods of their choice.

Extended Tree Chart | I, D

Now that you have organized your current knowledge regarding several topics, explore several sources of information to find out more about these topics. You may wish to interview someone, review magazine articles, view a filmstrip, or read about your topics. Familiarize yourself with each topic and extend the tree chart that you generated in Activity C using a different color of ink.


topic a
related idea a
related idea b
related idea a, 1
related idea a, 2
related idea a, 3
related idea b, 1
related idea b, 2
related idea b, 3
related idea a, 1, a
related idea a, 1, b
related idea a, 1, c
related idea a, 3, a
related idea a, 3, b
related idea a, 3, c
related idea a, 3, d
related idea b, 1, a
related idea b, 1, b
related idea b, 1, c
related idea b, 1, d
related idea b, 2, a
related idea b, 2, b
related idea b, 3, a
level I ideas
level II ideas
level III ideas

Stage I: Activity E

After students have explored resources related to several topics, they will select a topic to pursue in more depth. The topic selection grid will assist students in making informed decisions by allowing them to critique each topic based on selected criteria. Several suggested criteria appear on the grid; however, students may wish to substitute criteria that address their needs more accurately. The totals are meant to serve as indicators to help students make informed decisions. The highest total does not dictate student choice, as each criterion is open to interpretation and may be unequal in value to the other criteria.

Topic Selection Grid — I, E

List the topics that you have been considering for your independent study project in the column on the left of the chart. Review each criterion at the top of the chart and substitute more appropriate criteria as needed. Then rate each topic from 1 – 5 (low to high) working your way down (not across) each column. When you have finished rating, add the totals across. Use the totals and the individual ratings to help you make an informed decision. You do not necessarily have to select the topic with the highest score.

SELECTION CRITERIA	1. available information	2. appropriately complex materials	3. interesting for the learner	4. potentially useful findings	TOTALS
TOPICS 1.					
2.					
3.					
4.					

Stage I: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both students and teachers.

Cooperative Review – Stage I							I, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage I.						
rules of brainstorming ___/___/___	I considered many, varied topics for possible study.						
tree chart ___/___/___	I organized existing knowledge related to selected topics.						
extended tree chart ___/___/___	I explored information related to selected topics of interest.						
topic selection grid ___/___/___	I selected a topic of genuine interest for further study.						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___	✔ Please attach all work.

Notes:

STAGE II: STATE A CHALLENGE

Stage II of independent study is for those students wishing to (1) generate many, varied questions for possible exploration; (2) refine several questions into hypotheses; (3) assess the degree to which selected questions and hypotheses will target "existing" vs. "new" information; and/or (4) select a question or hypothesis of genuine interest for further study. If a challenge (research question or hypothesis) has already been selected, this stage should be omitted. A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

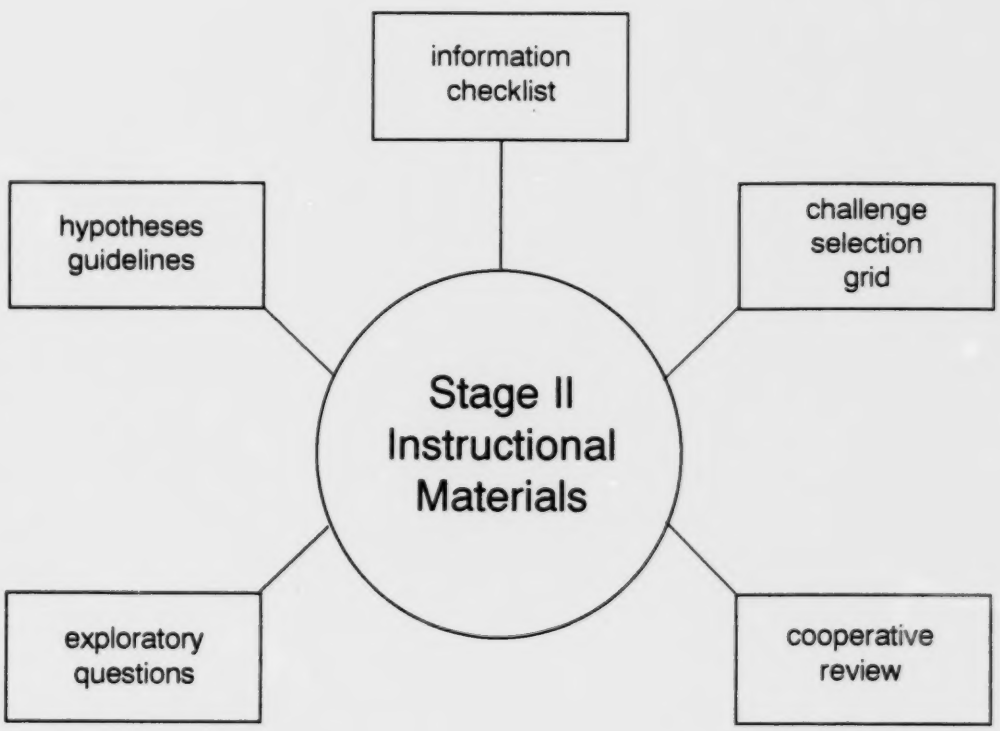
Stage II Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage II	by reviewing *instructional materials* available for Stage II
to generate many, varied questions for possible exploration	by developing *exploratory questions* in a variety of categories
to refine several questions into hypotheses	by applying *hypotheses guidelines* to several questions of interest
to assess the degree to which selected questions will target "existing" vs. "new" information	by considering verbs listed on *information checklist* to make speculations
to select a question or hypothesis of genuine interest for further study	by establishing and/or applying criteria via a *challenge selection grid*
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage II: Activity A

Activity A will help students develop an understanding of the objectives and activities for Stage II of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to review instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage II before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	II, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage II: Activity B

Activity B serves to help students develop a variety of exploratory questions. Through quantity and variety, students increase the likelihood of discovering a question of genuine interest. Students are to apply the rules of brainstorming as they complete this activity.

Exploratory Questions	II, B

Review the rules of brainstorming before you begin this activity. Apply the rules of brainstorming as you develop at least several questions in each of the eight following categories.

Who?

-
-
-
-

What?

-
-
-
-

When?

-
-
-
-

Where?

-
-
-
-

Why?

-
-
-
-

How?

-
-
-
-

What would happen if?

-
-
-
-

In what ways might I?

-
-
-
-

Stage II: Activity C

Once students have developed many varied questions, they may find it helpful to refine selected questions into hypotheses. By doing so, they may increase the exactness of the question, and in turn, narrow their approach. Guidelines to assist the development of hypotheses are presented below.

Hypotheses Guidelines	II, C

Review the questions that you generated in Activity B to select those that appear most appealing. Adapt and refine several of them into hypotheses. This will help you to narrow your focus. If you think of new questions and hypotheses during this activity, list them as well. Guidelines to assist you in developing hypotheses follow:

An hypothesis:

1. states an expected relationship or difference between two or more variables;

2. is grounded in theory or previous research;

3. is a concise statement; and

4. can be tested.

Stage II: Activity D

In Activity D, students will assess the degree to which selected questions and hypotheses will target "existing" vs. "new" information. Through this activity students may be asked to favor questions that bring about "new" information in order to complement and extend information that has been compiled by others.

Information Checklist	II, D

Review the questions and/or hypotheses that you have developed and select those that seem most appealing. Review the verb lists below to determine the types of activities in which you expect to become engaged. Favor those activities that will bring about information which, up to this point in time, has not been recorded.

"EXISTING" INFORMATION — "NEW" INFORMATION

E ← 5 4 3 2 1 0 1 2 3 4 5 → N

Activities likely to involve "existing" information: listing, reproducing, collecting, summarizing, analyzing, combining, organizing, and classifying.

Activities likely to bring about "new" findings: adding to, substituting for, varying, refining, judging, justifying, deciding, and verifying.

Write Question A: _____

Rate Question A:

E ← 5 4 3 2 1 0 1 2 3 4 5 → N

Write Question B: _____

Rate Question B:

E ← 5 4 3 2 1 0 1 2 3 4 5 → N

Write Question C: _____

Rate Question C:

E ← 5 4 3 2 1 0 1 2 3 4 5 → N

Write Question D: _____

Rate Question D:

E ← 5 4 3 2 1 0 1 2 3 4 5 → N

Stage II: Activity E

After students have explored various questions and hypotheses, they will select one to pursue. The Challenge Selection Grid will assist students in making informed decisions by allowing them to critique each challenge based on selected criteria. Several suggested criteria appear on the grid; however, students may wish to substitute criteria that address their needs more accurately. The totals are meant to serve as indicators to help students make informed decisions. The highest total does not dictate student choice, as each criterion is open to interpretation and may be unequal in value to other criteria.

Challenge Selection Grid | II, E

List the challenges (questions and/or hypotheses) that you are considering for your independent study project in the column on the left of the chart. Review each criterion at the top of the chart and substitute more appropriate criteria as needed. Rate each challenge from 1 – 5 (low to high) working your way down (not across) each column. When you have finished rating, add the totals across. Use the totals and the individual ratings to help you make an informed decision. You do not necessarily have to select the challenge with the highest score.

SELECTION CRITERIA	1. available information	2. appropriately complex materials	3. interesting for the learner	4. potentially useful findings	TOTALS
CHALLENGES 1.					
2.					
3.					
4.					

Stage II: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both teachers and students.

Cooperative Review – Stage II							II, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage II.						
exploratory questions ___/___/___	I generated many, varied questions for possible exploration.						
hypotheses guidelines ___/___/___	I refined several questions into hypotheses.						
information checklist ___/___/___	I assessed the degree to which selected questions will target existing vs. new information.						
challenge selection grid ___/___/___	I selected a question or hypothesis of genuine interest for further study.						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___	✔ Please attach all work.

Notes:

STAGE III: DEVELOP A PLAN

Stage III of independent study is for those students wishing to (1) articulate the focus of the study; (2) determine the purpose of the research project; (3) determine characteristics of the study; and/or (4) speculate on which research activities will ensue for the remainder of the project. If the research project has been sufficiently planned, this stage should be omitted. A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

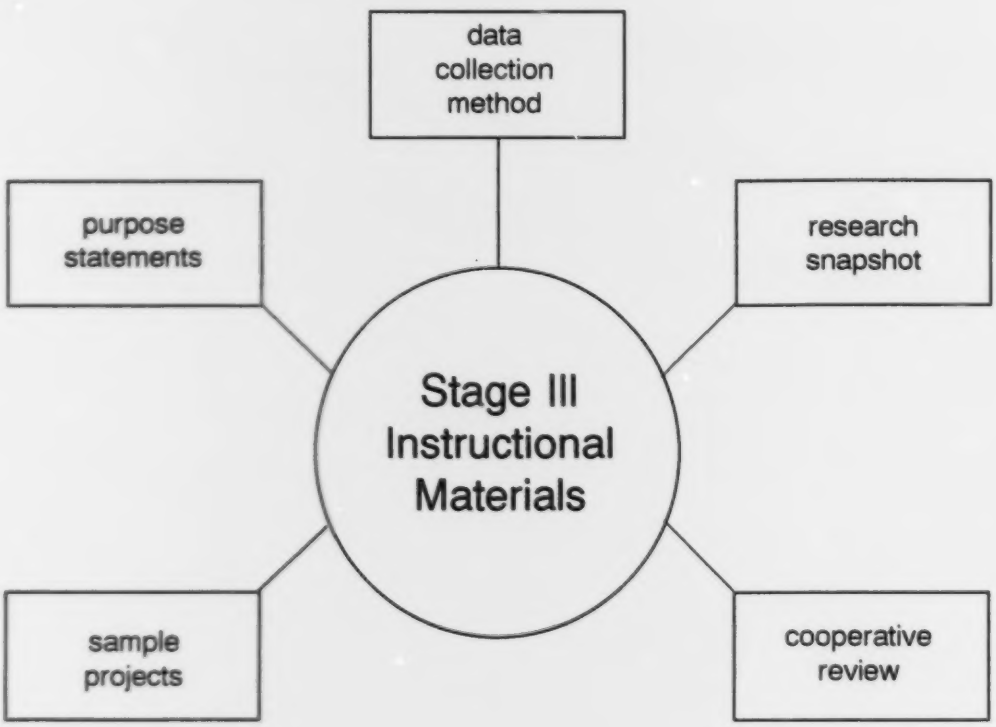
Stage III Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage III	by reviewing *instructional materials* available for Stage III
to articulate the focus of the study	by reviewing several *sample projects* within each design category
to determine the purpose of the research project	by developing a *purpose statement* for the project
to determine characteristics of the study	by establishing the *data collection method*
to speculate on which research activities will ensue for the remainder of the project	by developing a *research snapshot*
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage III: Activity A

Activity A will help students to develop an understanding of the objectives and activities for Stage III of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to review instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage III before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	III, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage III: Activity B

Activity B asks students to review sample projects in each of five categories (research designs). Doing so provides ideas for projects so that students can adapt their questions or hypotheses (as necessary) in regard to a specific research method. In this activity students will articulate the focus of their investigation by establishing which research method they are likely to use.

Sample Projects				III, B
Design	Language Arts	Mathematics	Science	Social Studies
Causal-Comparative				
Correlational				
Descriptive				
Experimental				
Historical				

Stage III: Activity C

Activity C asks students to determine a purpose statement for their projects. This will help them to refine their investigations by determining which type(s) of data collection method(s) will best support their progress.

Purpose Statement	III, C
Research Design	Directions: Review the following purpose statements and decide which statement reflects the purpose of your independent study project. Then complete the statement by entering information related to your project.
Causal-Comparative	My research project will examine potential cause-effect relationships by my searching for possible causes after-the-fact. The cause-effect relationship that I am searching for is …
Correlational	My project will determine the type and degree of relationship between two variables. The two variables in my project are …
Descriptive	My project will describe the nature and degree of existing conditions in regard to …
Experimental	My project will determine a cause-effect relationship between independent and dependent variables, which are ...
Historical	My project will accurately and objectively describe past events such as …

Stage III: Activity D

Activity D requires students to make decisions about the data collection methods that they will use to investigate their topics. Determining the data collection method will help students to verify their choice of research design.

Data Collection Method	III, D
Research Design	Directions: Review the following data collection methods and decide which one will best support your project. It should be in the same category as your purpose statement. Complete the final statement by entering information related to your project.
Causal-Comparative	The types of resources that I will use to gather data will include information about events that have already occurred, such as …
Correlational	The types of resources that I will use to gather data will include existing information (e.g., records), such as …
Descriptive	The types of resources that I will use to gather data will include questionnaires, interviews, observations, tables, graphs, charts, displays, frequencies, percentages, such as …
Experimental	The types of resources that I will use to gather data will include observations of two variables, experimental and control groups, such as …
Historical	The types of resources that I will use to gather data will include primary sources (such as photo albums and original documents) and secondary sources (such as reference books and videos), including …

Stage III: Activity E

Completing a Research Snapshot requires students to plan the remainder of their independent study activities. They will enter information generated through previous activities into rows 1 through 4, and they will speculate on responses to the items in rows 5 and 6.

Research Snapshot	III, E
Complete the following chart as a "snapshot" of your investigation. Use the information and decisions that resulted from previous activities to complete the first four categories. Make tentative speculations regarding the last two categories. You should now have a clear idea of where your project is headed.	
1. Independent Study Topic:	
2. Research Question or Hypothesis:	
3. Purpose Statement:	
4. Data Collection Method:	
5. Product Form:	
6. Intended Audience:	

Stage III: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both teachers and students.

Cooperative Review – Stage III							III, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage III.						
sample projects ___/___/___	I articulated the focus of the study.						
purpose statements ___/___/___	I determined the use for the research project.						
data collection method ___/___/___	I determined the characteristics of the study.						
research snapshot ___/___/___	I speculated on the research activities that will ensue for the remainder of the project.						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___ 145	✔ Please attach all work.

Notes:

STAGE IV: GATHER INFORMATION

Stage IV of independent study is for those students wishing to (1) increase awareness of various sources of information; (2) select various information resources; (3) access and record new information; and/or (4) locate and record existing information for the selected challenge. If sufficient information has already been gathered, this stage should be omitted. A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

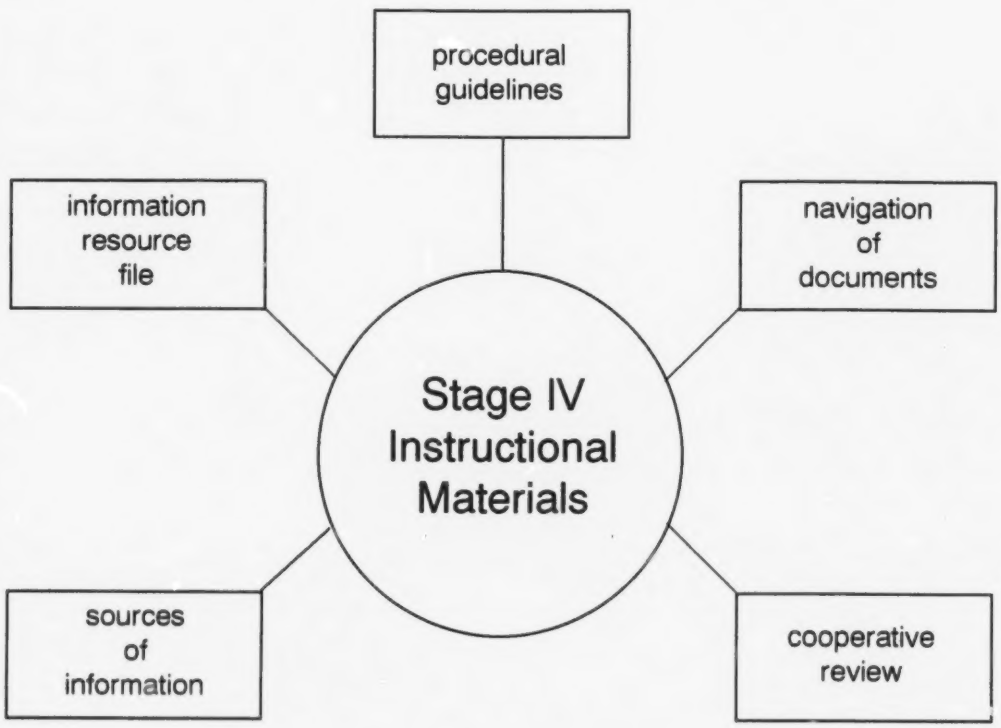
Stage IV Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage IV	by reviewing *instructional materials* available for Stage IV
to increase awareness of various sources of information	by reviewing *sources of information* as displayed and discussed in class
to select various information resources	by reviewing the *information resource file* for potential useful sources of information
to access and record new information	by using *procedural guidelines* for conducting interviews, observations, and/or surveys
to locate and record existing information for the selected challenge	by *navigating documents* for key information
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage IV: Activity A

Activity A will help students to develop an understanding of the objectives and activities for Stage IV of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to review instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage IV before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	IV, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage IV: Activity B

The quantity and variety of available information sources has increased rapidly. Developing students' awareness of the uses of these resources is an essential role for educators wishing to foster skills of independent study.

Possibly the most noteworthy of these sources of information is the on-line database. Through electronic databases, students at virtually any location can access rich supplies of data using retrieval methods that are much more efficient and effective than manual searches.

Sources Of Information — IV, B

Carefully review the following list of sources of information. Ask for assistance if you are unfamiliar with the uses and location of any of the resources in these four categories.

Documents

- almanac
- atlas
- biography
- book of records
- dictionary
  - general
  - bibliographical
  - geographical
- electronic media
  - audiocassette
  - compact disk
  - database
  - filmstrip
  - record
  - videocassette
  - videodisk
- encyclopedia
  - general
  - specialized
- guides to
  - *National Geographic*
  - periodical literature
- historical book
- magazine
- scientific book
- musical scores
- textbook
- thesaurus

Interviews

- within school
  - staff
  - students
- within community
  - agencies
  - neighbors
  - parents
- outside of community
  - academic
  - business
  - government

Observations

- low inference
- high inference

Surveys/Questionnaires

- attitudes
- opinions
- perceptions
- preferences

Stage IV: Activity C

An Information Resource File will assist students in developing and maintaining awareness of various sources of information. The file can be constructed in various formats, such as index cards, information sheets, a bulletin board, a poster, or in a computer database. The types of data that might appear in each file include the name of the medium, its contents, and its location.

More sophisticated media, such as on-line databases, generally provide users with information regarding system use.

Information Resource File	IV, C

Use the Information Resource File to determine which types of resources will best serve your investigation and where you can find each source.

Almanac	
contents	location
general statistics on a variety of topics	classroom bookshelf

Atlas	
contents	location
maps, time zones, flags, rivers, parks, and other information about the world	school library: resource section

Biography	
contents	location
history of a person's life	school library: non-fiction section

Stage IV: Activity D

Procedural guidelines assist students in various information-gathering activities, such as arranging and conducting interviews, observations, and surveys. They contain step-by-step instructions describing each process. They assist teachers in terms of presenting complete guidelines during direct instruction, and they assist students who wish to conduct these information-gathering activities on their own. (See sample below.)

Procedural Guidelines: Interviews | IV, D

An interview has three major phases. Read through the guidelines, ask questions as necessary, and keep this guide available during each of the interview phases.

Before The Interview

1. Write down the objectives of the interview. Generate several open-ended questions to facilitate discussion. Generate convergent questions that target the person's unique strengths or knowledge. Keep your projected time limit in mind.

2. Schedule the interview by stating/discussing (a) your name; (b) a concise description of the project; (c) the reason the person was selected; (d) the amount of time you will need; (e) possible meeting times and locations that might be convenient for the person; (f) contact information for both parties; and (g) your appreciation.

At The Interview

1. Set the tone of the interview by (a) introducing yourself; (b) shaking hands; (c) thanking the person; (d) explaining the objectives of the session; and (e) promising to keep to the allotted time limit.

2. Ask questions by (a) requesting permission to take notes and/or taping the session (audio or video); (b) using open-ended questions to facilitate discussion; (c) "fitting" convergent questions into the discussion as appropriate; (d) making frequent eye contact; (e) listening carefully; (f) asking questions as they arise; (g) refocusing the discussion as necessary; (h) writing down key ideas only; and (i) visualizing the concepts being discussed.

After The Interview

1. Close the interview by (a) stating that the session time has ended; (b) thanking the person; (c) restating how the information will be used.

2. Finalize this information-gathering activity by (a) reviewing your notes/tape as soon as possible; (b) isolating and rewriting key concepts; (c) sending a thank you note to the person; and (d) sending a copy of your product (as appropriate) to the person.

Stage IV: Activity E

Students will increase their skills of locating and recording written information through guidance and practice. Direct instruction in methods of navigating written media can be supported through instructional resources that remind students of the steps to be taken. Students will become efficient investigators by focusing on information of decreasing capacity (i.e., they will move from "big" to "small" ideas).

Navigating Documents	IV, E

When "skimming" written documents for information, begin with "big" ideas and move toward progressively "smaller" ideas. Determine as soon as possible whether or not a selected medium will respond to your question or hypothesis so that you spend time only with potentially useful documents. Only spend time with those media that show promise. Beginning with the selection of a document, progress to a chapter, major headings, subheadings, topic sentences, sentences within paragraphs, and finally to key phrases, terms, and figures that respond to your research question or hypothesis.

1. Using the Resource File, select a document that might respond to your research question or hypothesis.
2. Review the table of contents to determine which chapters might contain information regarding your question or to the variables in your hypothesis.
3. Look over the major headings in a select chapter and choose any major sections of the chapter that may contain answers to your research question or describe the variables in your hypothesis.
4. Determine which subheadings within the selected major heading might contain answers to your research question or which might describe the variables in your hypothesis.
5. Read the first sentence in each of the large paragraphs within selected subheadings to determine which paragraphs might contain answers to your research question or which might describe the variables in your hypothesis.
6. Carefully read those selected paragraphs that show promise.
7. On separate note cards, record phrases, key terms, and key figures that answer your research question or that describe your research variables.

Stage IV: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both students and teachers.

Cooperative Review – Stage IV							IV, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage IV.						
sources of information ___/___/___	I increased my awareness of various sources of information.						
information resource file ___/___/___	I selected various information resources.						
procedural guidelines ___/___/___	I accessed and recorded new information.						
navigation of documents ___/___/___	I located and recorded existing information relating to the selected challenge.						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___	✔ Please attach all work.

Notes:

STAGE V: ORGANIZE INFORMATION

Stage V of independent study is for those students wishing to (1) select and organize relevant findings; (2) collect and organize numerical data; (3) consider the variances within a set of data; and/or (4) determine the correlation between two sets of data. If collected information has been organized sufficiently, this stage should be omitted. A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

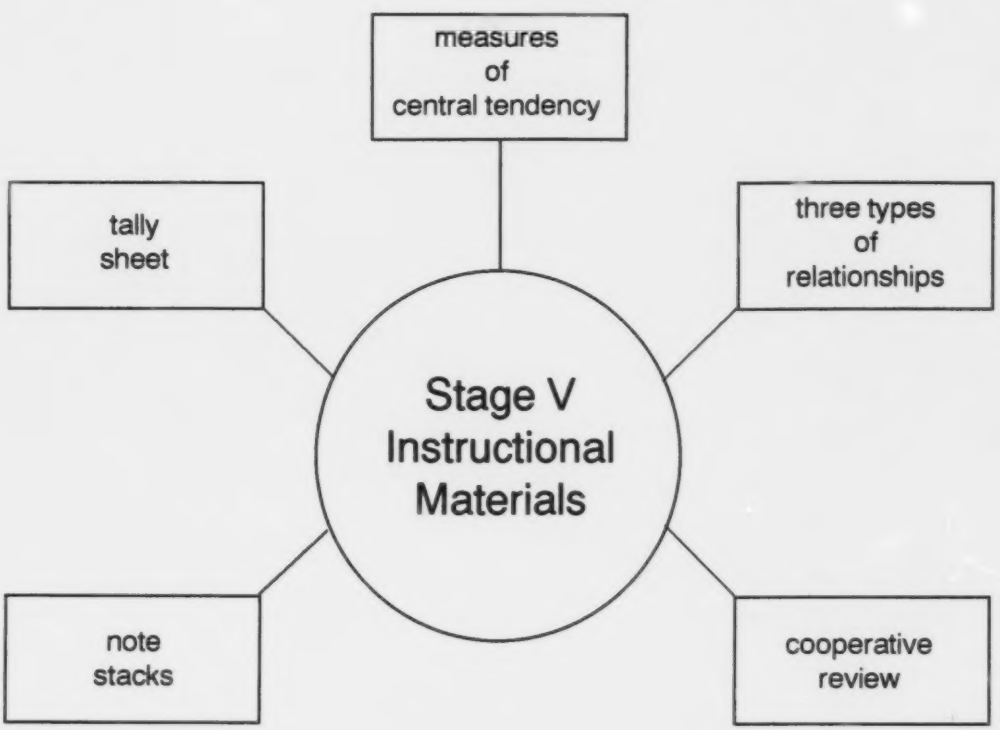
Stage V Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage V	by reviewing *instructional materials* available for Stage V
to select and organize relevant findings	by developing *note stacks* based on mutually relevant concepts
to collect and organize numerical data	by entering numerical data onto a *tally sheet*
to consider the variances within a set of data	by determining the *measures of central tendency:* mean, median, and mode
to determine the correlation between two sets of data	by considering *three types of relationships:* positive, negative, and zero (no correlation)
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage V: Activity A

Activity A will help students to develop an understanding of the objectives and activities for Stage V of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to review instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage V before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	V, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage V: Activity B

Students who have recorded notes from various information sources will find it necessary to organize the notes that are relevant to the investigation and put aside the notes that are not. This activity will help students who have collected written data to consider the nature and organization of their findings before they begin to develop a product.

Note Stacks	V, B

This activity will help you to organize your notes and to determine which notes may be put aside. Begin by establishing "piles" of note cards, keeping similar topics and ideas together. Next, break down your piles into level I ideas (major topics), level II ideas (subtopics), and level III ideas (supporting details) by grouping and indenting note cards using an outline format. Develop new note cards as needed to serve as major topics or subtopics.

Title
- level I note
  - level II note
    - level III note
    - level III note
  - level II note
    - level III note
    - level III note
    - level III note
    - level III note
- level I note
  - level II note
    - level III note
    - level III note
    - level III note
  - level II note
    - level III note

Stage V: Activity C

Tally sheets provide students with a way of organizing numerical data. The design of a tally sheet is always specific to the data collected. An example follows.

Tally Sheet	V, C

Organize your numerical data by designing and using a tally sheet. Tally sheets are useful in structuring data collected through observations, questionnaires, and surveys. See the sample tally sheet below.

Average Daily Hours of TV Viewing by Central H.S. Students

Hours of Viewing	Grade 9 Students	Grade 10 Students	Grade 11 Students	Grade 12 Students
0-1				
1-2				
2-3				
3-4				
4-5				
5-6				
6-7				
7-8				
8+				

Stage V: Activity D

Measures of central tendency provide a single number to represent all of the numerals within a set of data (adapted from Borg, 1987, p. 147). These measures provide students with a method to identify the degree of variance within a set of data. Mean, median, and mode are three measures of central tendency that may be calculated using the formulas below.

Measures Of Central Tendency	V, D

Measures of central tendency allow you to determine the degree of variance within a set of data. Calculate the mean, median, and mode by observing the following formulas.

Where is the center of distribution located?

1. Median: The Middle Score

   With an odd number of scores, determine the median by finding the middle score when arranged from lowest to highest or vice-versa.

   With an even number of scores, add the middle 2 scores and divide by 2.

2. Mean: The Average Score

   Total the scores and divide by the total number of scores.

3. Mode: The Most Frequent Score

   Determine the mode by listing the scores and selecting the score that appears most often.

Stage V: Activity E

Students conducting correlational research will organize their findings by showing relationships between two sets of data. Three types of relationships may be demonstrated: a positive correlation, a negative correlation, and no (zero) correlation.

Three Types Of Relationships	V, E

When conducting correlational research, it is important to describe the relationship between the two variables. The relationships may be described as (1) positive; (2) negative; or (3) zero – no correlation. The chart below explains the three types of correlations.

Type of Correlation	Situation	Variable 1	Variable 2
Positive	1	increase	increase
	2	decrease	decrease
Negative	3	increase	decrease
	4	decrease	increase
Zero	5	increase	no change
	6	decrease	no change

Stage V: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both teachers and students.

Cooperative Review – Stage V							V, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage V						
note stacks ___/___/___	I selected and organized relevant findings.						
tally sheet ___/___/___	I collected and organized numerical data.						
measures of cent. tendency ___/___/___	I considered the variances within a set of data.						
3 types of relationships ___/___/___	I determined the correlation between two sets of data.						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___	✔ Please attach all work.

Notes:

STAGE VI: REPORT THE FINDINGS

Stage VI of independent study is for those students wishing to (1) select an audience for research findings; (2) select a product form with the capacity to communicate research findings; (3) develop a product that clearly presents research findings; and/or (4) present research findings effectively to selected audience(s). A list of suggested objectives and sample activities is provided below. Sample activities and instructional resources appear on the pages that follow.

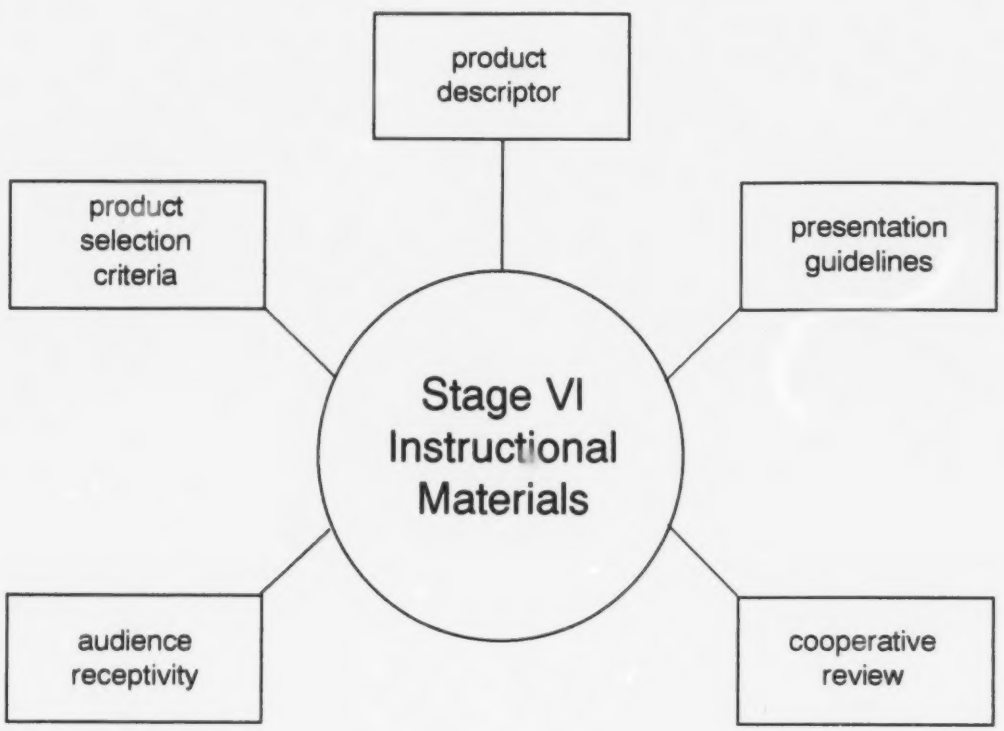
Stage VI Planning	
Objectives	**Activities**
to develop an understanding of objectives and activities for Stage VI	by reviewing *instructional materials* available for Stage VI
to select an audience for research findings	by assessing *audience receptivity* of selected groups
to select a product form with the capacity to communicate research findings	by applying *product selection criteria* to various product options
to develop a product that clearly presents research findings	by deciding upon and/or applying attributes of effective products via a *product descriptor*
to present research findings effectively to selected audience(s)	by applying *presentation guidelines* to the presentation
to record progress and evaluate activities	by rating one's proficiency in meeting the objectives through the completion of a *cooperative review*

Stage VI: Activity A

Activity A will help students to develop an understanding of the objectives and activities for Stage VI of independent study. Students are to obtain a Cooperative Review and read the objectives related to this stage. Next, they are to look over instructional materials that will assist them in completing each of the activities. This activity serves to familiarize students with Stage VI before they begin their tasks. Sample instructional materials appear on the following pages.

Instructional Materials	VI, A

Familiarize yourself with this stage of independent study. First, obtain and read a Cooperative Review. Then, look over the other available instructional materials that are labeled below. Begin thinking about the activities that you will be engaged in during this stage.



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Stage VI: Activity B

Research findings will be perceived more favorably when the audience has been selected based on its potential receptivity to the topic. The quality of the findings, the product, and the presentation may only be fully appreciated when an audience is likely to value the project. In Stage III, Activity C, students speculated on potential audiences. They are now asked to select an audience.

Audience Receptivity | VI, B

Even when a project is of the highest quality, it is important to present the findings to someone or to a group of individuals who will appreciate your work. In Stage III, Activity C, you speculated who the audience might be. Now, use the questions below to determine the makeup of the audience to whom you will present your findings. To do so, complete the following statements:

People (individuals, groups, organizations, etc.) who might ...

- be curious about my research findings:
- understand my research findings:
- benefit from my research findings:
- enjoy hearing about my research findings:
- value my research findings:
- utilize my research findings:

Stage VI: Activity C

Selecting an appropriate product form involves determining which form might best communicate the findings to the selected audience. This decision-making process is facilitated when students review product lists and consider product selection criteria. Displaying both types of information in class is suggested. (For more information on matching products to learning activities please see Section III, Goal II, Strategy C in this guide.)

Product Selection Criteria | VI, C

Review a list of product possibilities and consider the following criteria as you select a product to communicate the results of your investigation.

Interesting for the Learner
- Are you enthusiastic about developing this type of product?
- Do you have something to gain by developing this type of product?

Challenging for the Learner
- Is this product form relatively new to you?
- If you have produced in this format before, will this version be more complex than before?

Matched to the Content
- Does this product form have the structural format (e.g., linear, hierarchical, global) to support your topic?
- Does this product form have the capacity to present the quantity of information regarding your topic?
- Does this product form have the potential to convey emotional factors related to your topic?

Matched to the Audience
- Will the audience be able to interpret or understand this type of product?
- Will the audience be curious about, attracted to, or enjoy this type of product?
- Will the audience be able to see, hear, or otherwise interact with the product?

Realistic
- Do you have sufficient work time to develop this type of product?
- Can you obtain the materials necessary for developing this type of product?
- Will you be able to acquire the necessary assistance for developing this type of product?
- Can you obtain the necessary reference materials for developing this type of product?
- Do you have the requisite skills or background experience to develop this type of product?

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Stage VI: Activity D

Product descriptors foster effective communication by articulating essential characteristics of various products. Each product is described in terms of its component parts and in terms of the attributes which make it effective. (For more information regarding product descriptors please see Section III, Goal III, Strategy B in this guide.)

Product Descriptor	VI, D
Product descriptors will help you communicate what you learned through your investigation. They break products down into their component parts and essential attributes. After you select a product to communicate your findings, obtain or develop a product descriptor before you begin developing your product. In this way, you can establish specifications before you develop it. A sample is provided below.	

Time Line – visual	
Parts	**Attributes**
title	prominent, concise, summarizes
line	ruled, may represent topic, arrowed
time increments	uniform size per unit of time, clearly visible, equal intervals, sub-units of time for important events
labels	printed legibly, uniform size, represent key events
illustrations	limited, highlight key events/concepts
background	non-obtrusive, may support main concept
credits	discrete, alphabetized, visible from front
negative space	surrounds text, graphics, and boundary of product

Stage VI: Activity E

Many times students will present their research findings to others through a verbal report. To facilitate this process, students may be asked to review and practice skills of oral presentation. Clearly articulated skills may also serve as guidelines for self critique and/or peer critique. A critique may occur at the time of the presentation or later via videotape.

Presentation Guidelines	VI, E

The skills on the self-rating sheet below should be reviewed and practiced several times before you present your ideas to your intended audience. Practicing with friends or family members may be helpful. After each practice session, rate yourself from 1 – 5 ("needs work" to "excellent") in each suggested area.

	1	2	3	4	5
introduction of speaker, project, and major concepts					
key points well-sequenced					
key points supported with facts and details					
intermittent summarizations and transition statements					
inclusion of audience					
use of product(s)					
natural, supportive movements and gestures					
sustained eye contact, including periphery of room					
clear, well-paced voice					
summary of major concepts					

Stage VI: Activity F

At the beginning of each stage of independent study, a student will obtain a Cooperative Review, complete the name and starting date, read the objectives, and review the instructional materials. As each activity is completed, the student will attach all work and critique all progress. After the final activity of the stage is completed, the student will offer subjective comments at the bottom of the Cooperative Review and will confer with the teacher before progressing to the next stage. At the end of each stage of independent study, the teacher may find it helpful to designate a grade or point value. This allows the student credit for developing many, varied skills of independent study. It also provides feedback for both teachers and students.

Cooperative Review – Stage VI							VI, F
student name:			starting date:				
schedule	objectives	critique:	na	nsh	g	vg	grt
instructional materials ___/___/___	I developed an understanding of objectives and activities for Stage VI.						
audience receptivity ___/___/___	I selected an audience for research findings.						
product select. criteria ___/___/___	I selected a product form with the capacity to communicate research findings.						
product descriptor ___/___/___	I developed a product that clearly articulates research findings.						
presentation guidelines ___/___/___	I effectively presented research findings to selected audience(s).						
cooperative review ___/___/___	I recorded my progress and evaluated activities.						

student comments:	teacher comments:
•	•
•	•
•	•
student signature: _____	teacher signature: _____
completion date: ___/___/___	✔ Please attach all work.

Notes:

SECTION V:

UNITS OF

STUDY

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Developing Units of Study

by James Curry

Introduction to the Model

Five sample units are offered in this section to provide classroom teachers with samples that may be used in designing curricula in response to varying academic needs of students within areas of study. The first four units focus on the subject areas of literature, mathematics, science, and social studies and use "essential elements" as the core of learning. Classroom teachers are invited to add other elements to the prescribed content of the units. Sources of additional content elements may include textbooks, reference books, departmental scope and sequence guides, current events, areas of expertise of the teacher, and interests of the students. The fifth unit uses a multidisciplinary approach that combines information from the four subject area units into a unit that focuses on the thematic study of *order*.

The matrix used in each unit may be divided into four sub-matrices (or quadrants). Each quadrant represents a different type of curriculum for students. Quadrant One includes cells 1-2-3, 7-8-9, and 13-14-15. Instruction in this quadrant may use traditional forms of teaching strategies. Activities are designed to assist students in (a) mastering existing information through basic thinking skills and (b) demonstrating their competencies through traditional product forms that may be assessed through objective criteria. The essential elements may be taught through direct instruction in this quadrant.

Quadrant Two of the matrix includes cells 4-5-6, 10-11-12, and 16-17-18. Instruction in this quadrant reinforces student mastery of the required content by requiring students to use abstract thinking skills of creative thinking, critical thinking, and problem solving. The activities in the second quadrant require students to demonstrate their content competencies and their abstract thinking skills through traditional or innovative product forms. The products serves as vehicles for students to demonstrate content mastery and higher-order thinking skills. Multiple product forms provide the teacher with a means to allow students to operate in their preferred modes of learning.

Quadrant Three of the matrix includes cells 19-20-21, 25-26-27, and 31-32-33. In this quadrant, students are introduced to complex content that relates to the previously studied, required content. The focus of instruction is on assisting students to learn about the debatable issues, the solvable problems, and the themes that extend from the factual information within the area of study. Thematic content includes studying the generalizations (or "big ideas") related to prescribed and related areas of study. In addition, there are opportunities for students to pursue independent study options. These options may be assigned by the teacher or selected by the students (individually or in small groups).

Quadrant Four of the matrix include cells 22-23-24, 28-29-30, and 34-35-36. In this quadrant, students utilize abstract thinking skills (creative, critical, and problem solving) with the complex content that was introduced in Quadrant Three. The focus of instruction is on assisting students

in (a) judging matters related to the issues, (b) generating ideas related to the problems, and on (c) exploring the "big ideas" related to the theme. As in Quadrant Three, there are opportunities for students to pursue independent study options. These options may be assigned by the teacher or selected by the students (individually or in small groups).

The numbers of the cells do not prescribe the order in which lessons and activities should be taught. Rather, the numbers provide a means for labeling the lesson plans for a unit. Hence, cell #3 is a "street address" for a corresponding lesson plan. There could be several lesson plans for one cell or no lesson plans for a cell. A teacher might choose to begin a unit in Quadrant Two by using an inquiry method, asking students to list all of the ideas that they have about a topic. Similarly, a teacher might begin a unit in Quadrant Four, asking students to express an opinion regarding an issue or a problem relating to the area of study. Teachers may also select to move the focus of instruction among quadrants after the unit has been introduced.

Sample Lesson Plans and Principles of Differentiation

Four sample lesson plans have been provided with each unit of study, one from each quadrant. The background area of the cells for these lessons have been shaded so that they may be quickly located on the matrix. In each sample lesson plan, there is a reference to the "principles of differentiation" that are met through the activity. In general, Quadrant One activities are meant to serve as a foundation for all learners and no differentiation is intended. In Quadrant Two, the process-based principles (relating to abstract thinking skills) and the product-based principles (relating to student outcomes) are usually cited in the sample lesson plans. In Quadrant Three, the process-based principles (relating to self-directed study) and the content-based principles are usually cited. In Quadrant Four, any of the principles of differentiation may be cited, as appropriate.

This approach does not provide educators with a means to write "gifted" curricula. Rather, it provides educators with a means to provide diverse instruction for meeting the varying academic needs of students. Teachers are encouraged to use and to adapt this model in ways that will make it useful to them in their classrooms.

Philosophy of Programming

The professional philosophy and the personal beliefs of each educator will influence the ways in which he or she selects, adapts, develops, implements, and assesses curricula. Each educator should examine his or her own perceptions regarding the nature and needs of gifted learners prior to planning curricula for these students. The following assumptions were presented by Curry and Samara (1991) in *Curriculum Guide for the Education of Gifted Students, Grades 9-12*, developed for the Georgia Department of Education.

1. The education of gifted students is part of each school district's commitment to provide services to all students.

2. Gifted students do need and must learn basic skills, master required content, and be able to present ideas through traditional product forms.

3. Gifted students may be gifted in one content area and not gifted in others.

4. Gifted students can be gifted and have a handicapping condition, be economically deprived, be culturally diverse, and/or have a behavior problem. These conditions should not be viewed as deficits but rather as indicators of individual differences within the population of gifted students.

5. Curriculum for gifted students should be developed based on a clear understanding of the characteristics that distinguish gifted students from their age peers (for whom the regular curriculum is planned).

(p. 6)

Origin of the Model

The model that was used to construct the units is based on the work of Sandra N. Kaplan. While adaptations have been made to the structure of the model, credit and sincere appreciation for this approach to curriculum development must be given. In *Providing Programs for the Gifted and Talented: A Handbook*, Kaplan (1974) presents strategies for using a matrix to integrate the curricular dimensions of content, process, research skill, and product into learning activities for gifted learners. This approach to curriculum development is extended and refined by Kaplan (1979) in the publication *Inservice Training Manual: Activities for Developing Curriculum for the Gifted/Talented*. Kaplan (1986) provides a step-by-step description of her approach to curriculum development in the chapter "The Grid: A Model to Constructing Differentiated Curriculum for the Gifted," in *Systems and Models for Developing Programs for the Gifted and Talented*, edited by Joseph S. Renzulli. Sandra Kaplan has continued to develop her approach to curriculum development and differentiation through an international curriculum project.

Classroom Management and Grouping for Instruction

The matrix provides teachers with a strategy for having different students engaged in appropriate activities with differing but related foci. For example, while students requiring additional direct instruction in the prescribed content area may work on a Quadrant One activity, a group of students who have mastered the essential elements may work on an activity from one of the other quadrants. At the same time, an individual student with an intense interest in a related area of study may work independently on a self-selected topic. These are examples of grouping for instruction.

The activities in Quadrant One may be used for providing large group instruction in the "basics" needed by all students. As appropriate, the activities in Quadrant One may be modified for gifted learners through strategies of acceleration (including "testing out" or "compacting"). However, all students should learn the essential elements in this quadrant. Activities in the first quadrant may also be used to (a) provide traditional reinforcement activities and (b) provide additional practice for students who require more time and opportunities to master the essential elements.

The activities in Quadrant Two may be used for large group instruction, small group instruction (for like-ability or for cross-ability groups), or for individual students through learning centers. The focus in the first two quadrants is on assisting students to master and to internalize the required content in the unit of study. Activities in the second quadrant may also be used in classrooms to (a) motivate students who have been "uninspired" or unsuccessful in previous activities and (b) provide open-ended activities for students who have been "underchallenged" in previous activities.

The activities in Quadrant Three may be used for large group instruction, small group instruction (in like-ability or in cross-ability groups), or for individual students pursuing an area of interest through independent study. In general, students should not participate in third-quadrant activities until they have learned the "essential elements" in the first quadrant. One exception to this is if the teacher decides to begin a unit of study by posing an issue or a problem-based question to students as a means to involve them in the area of study. Activities in the third quadrant may also be used to (a) extend the area of study to multiple disciplines and (b) provide students with opportunities to pursue areas of personal interest.

The activities in Quadrant Four may be used for implementing large group, small group, or individual activities for high-ability students. While the fourth quadrant does not represent "territory" restricted to use by academically gifted students, within this quadrant there are the most opportunities for implementing the greatest number of the principles of differentiation through learning experiences.

It is important to recognize that "grouping for instruction" is *not* the same as tracking. In the traditional practice of tracking, students remain in static groups for all areas of instruction, regardless of their relative academic strengths, weaknesses, and interests. In grouping for instruction, students are grouped and re-grouped based on their needs, their levels of mastery and readiness, their interests, and their skills of self-directed learning. Grouping strategies should not be the impetus for decisions regarding instruction. Rather, grouping should be viewed as a means for facilitating successful learning experiences. Teachers must select patterns of grouping that complement the needs of the learners and enhance the effectiveness of instruction.

Articulation of Learning

While some needs of gifted students may be met through a "unit of study" approach, it is essential for educators to develop programs that provide for continuity across units of study. Too frequently, programs for gifted students are composed of fragmented, isolated learning experiences and activities that are not tied to program goals or to an overall design for scope and sequence. While units of study and lesson plans do provide the building blocks of an articulated program, they must be coordinated between grade levels and among content areas in order to provide gifted learners with opportunities for the planned and purposeful development of talent.

Educators as Architects of Curricula

One goal of this publication is to assist educators to be good "architects" of curriculum, using the basic blueprint of unit development as a means for aligning the learning experiences with the needs of the learners. A second goal of this publication is to assist teachers in identifying what they already do well and to share their successes with other educators. It may be that some of the best teaching ideas ever developed have never traveled beyond the doors of individual classrooms simply because the educational system did not facilitate the sharing of teacher-developed ideas among colleagues. Yet, it is in the creative process of personalizing curricula that the art and the science of teaching join together and form new opportunities for students and for teachers to develop and to share their talents.

Portions of this introduction were adapted from *Writing Units that Challenge High School Students: A Guidebook For & By Educators* (1991), edited by John Samara and James Curry, and distributed by Maine Educators of the Gifted and Talented, Portland, Maine.

UNIT 1

American Literature: The Romantic Era

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American Literature: Romantic Era: 1812-1860	BASIC →	
	Recall	Understand
SIMPLE ↓ COMPLEX **1. Selected authors:** a. James Fenimore Cooper b. Edgar Allan Poe c. Henry David Thoreau d. Emily Dickinson e. (another)	1/ listen to class lecture; read selections as assigned; review information on bulletin board •note	2/ describe the social context in which pieces of literature were written and read •discussion
2. Dimensions of literature: a. plot / setting / characterization b. tone / mood c. point of view d. symbolism / realism e. criticism	7/ review information regarding settings: -Appalachian Mts. -New England -the frontier •notes	8/ summarize the romantic view of the American Character as presented by the authors •chart & discussion
3. Dimensions of language: a. vocabulary b. structures c. dialects d. functions e. terminology	13/ examine the use of words and structures in conveying tone/mood/ point of view •group discussions	14/ summarize major factors that distinguish each author's style •report & outline
4. Issues/Problems: a. individual vs. society (I) b. security vs. adventure (I) c. nature vs. culture (I) d. identity – national & individual (P) e. the American Dream (P)	19/ review the distinguishing traits of the protagonists and antagonists •discussion/quiz	20/ classify each protagonist regarding the nature vs. culture continuum •worksheet
5. Theme: Order a. may be natural or constructed b. may allow for prediction c. may communicate concepts d. may enhance or impede freedom e. may have elements of chaos	25/ review key concepts: -harmony -wholeness -structure •discussion	26/ examine ways in which the authors interpret "natural order" •discussion
6. Independent Study a. option #1: [another author] b. option #2: [another work/genre] c. option #3: [another culture] d. self-selected: small group e. self-selected: individual	31/	32/

Use	Creative	Critical	Problem Finding
3/ identify aspects of "romanticism" and "realism" in the style of the author(s) •worksheet/outline	4/ speculate on what two authors would say to one another if they were to discuss styles of writing •scenario	5/ compare/contrast the writing styles and the philosophies of two authors •chart or poster	6/ mess-finding: specify positive and negative aspects of romanticism •list with narrative
9/ play the role of an author in a panel discussion on a topic of importance to a Romantic Era person •dramatization	10/ speculate on what ways the protagonist of one story might have responded in another story setting •script & illustrations	11/ defend/dispute the ideal of "heroism" presented by one author •debate & editorial	12/ data-finding: determine ways romanticism has influenced individualism •notes
15/ develop a personal vocabulary list using words from the literature •list	16/ add words and phrases to a section of a story or poem that will increase intensity or action •script	17/ distinguish between denotative and connotative meanings of words •chart	18/ problem-finding: identify the major "problem" of the hero in Romantic Era literature •written statement
21/ find articles in newspapers and magazines that relate to one of the issues •file	22/ generate many ideas for celebrating individual identities within a national identity •(written)	23/ affirm or dispute that the "American Dream" motivates modern individuals •self-selected	24/ idea-finding: generate many ideas for balancing individuality with citizenship •self-selected
27/ identify examples of natural and constructed order in several disciplines •report w/ charts	28/ think of unique ways in which "order" may be used to enhance freedom •self-selected	29/ affirm or dispute that order may have elements of chaos •class discussion	30/ solution-finding: set and use criteria to verify that individuals challenge or affirm order •self-selected
33/	34/	35/	36/ acceptance-finding: develop a plan of action for implementing a self-selected initiative •goals and time line

cross-referenced with *T.E.A. Essential Elements* (1988), pp. 99-100

LESSON PLAN #8

DIMENSIONS OF CURRICULUM

Content: dimensions of literature
Process: understand
Product: chart & discussion
Research: collect data: textbooks

LEARNING OBJECTIVE

In their study of characterization, students will be able to summarize the essence of the "American character" as presented by Romantic Era authors. Students will collect information from the text and secondary sources and will present their conclusions in a chart and in a class discussion.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the major aspects of the definition of characterization and the ways in which characters may be portrayed by an author;

2. remind students that they are being asked to demonstrate their comprehension of the subject matter by summarizing the information presented in primary and secondary sources;

3. explain to students that they will be working in small groups to share perceptions and ideas and to determine ways of presenting ideas on a chart;

4. remind students of the major types of charts and the key aspects of each type of chart as used to present information;

5. specify the criteria that will be used to critique and grade the charts;

6. assist students as they work in small groups to complete the assignment;

7. guide students from each group as they present their conclusions to other members of the class through a discussion format;

8. provide feedback to students regarding their charts and their presentations.

MATERIALS: primary and secondary literature sources; materials for developing charts (cardboard, markers, rulers, stencils, and tape)

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: no differentiation intended

LESSON PLAN #10

DIMENSIONS OF CURRICULUM:

Content: dimensions of literature
Process: creative thinking
Product: script and illustration
Research: none

LEARNING OBJECTIVE:

In their study characterization in literature, students will be able to use what they have learned to speculate on the ways in which the protagonist in one story might have responded to the challenge of another author's story. Students will present their ideas in a written script and an illustration.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the major aspects of characterization as they relate to the dimensions of plot, setting, tone, mood, and point of view in a story;

2. review with students the creativity thinking skill of flexibility, reminding students that they are to use their imagination to speculate on how a protagonist in one story might respond if placed into another story;

3. show samples of scripts and illustrations, reminding students of the key aspects of each product form;

4. present the criteria that will be used for assessing and grading the ideas and the product forms;

5. provide class time for students to begin listing ideas for their products;

6. ask students to continue to work on their products during the week (as homework) and to present their products on an assigned day the following week;

7. provide students with opportunities to share their final products with the class;

8. give students feedback regarding their ideas and their products.

MATERIALS: textbook, paper, drawing pencils

ENVIRONMENT: regular classroom

PRINCIPLES OF DIFFERENTIATION: integrate basic and higher-level thinking skills

LESSON PLAN #22

DIMENSIONS OF CURRICULUM:

Content: individual vs. society (I)
Process: creative thinking
Product: written product form
Research: review notes

LEARNING OBJECTIVE:

In their study of issues relating to American Romantic Era literature, students will be able to use what they have learned to generate many ideas for celebrating individual identities within an "American character" and will present their ideas through a written product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review the facets of the issue of individuality vs. society as portrayed in the poetry and prose of Romantic Era authors;

2. assist students in locating key phrases by the authors that convey the Romantic views on this issue;

3. remind students that they are being asked to think creatively, using the information that they have studied, and that the written product form will be selected by the group;

4. review the rules of brainstorming with the students and remind them of ways to respond to individuals who forget the rules;

5. assign the students to small groups and direct students to begin the assignment; walk among the groups, assisting students as needed;

6. indicate to students when it is time to begin to develop a written product form;

7. provide students with time to present group projects to the class;

8. give students feedback regarding their ideas and their products.

MATERIALS: textbook, paper

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, or themes; integrate basic and higher-level thinking skills

LESSON PLAN #26

DIMENSIONS OF CURRICULUM:

Content: theme of order
Product: discussion
Process: understand
Research: review notes

LEARNING OBJECTIVE:

In their study of the theme of order, students will examine ways in which American Romantic Era authors interpreted "natural order" in prose and poetry and will present their conclusions in a class discussion.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. assist students in reviewing the meaning of the generalization, *order may be natural or constructed*;

2. review the meaning of the term "natural order" as it was interpreted by the Romantic Era authors;

3. remind students that they are to focus their thinking on the comprehension level of mastery and that they should therefore demonstrate that they understand the terms and the concepts;

4. assist students in verbalizing the key aspects of "natural law" as defined by Cooper, Poe, Thoreau, and Dickinson;

5. provide students with a worksheet to use in checking the completeness of their proposed response;

6. assist students as they present their ideas through a class discussion;

7. provide students with feedback regarding the quality of their responses.

MATERIALS: primary and secondary source books

ENVIRONMENT: regular classroom

PRINCIPLES OF DIFFERENTIATION: present content this is related to broad-based issues, problems, or themes

Notes:

UNIT 2

Probability and Statistics

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SIMPLE ↓ COMPLEX	Probability and Statistics	BASIC → Recall	Understand
	1. Probability: a. definition b. characteristics c. purposes of prediction d. influences e. concepts	1/ participate in a simulation that uses terms for and examples of elements of probability •tree diagram	**2/ identify ways in which "prediction" is a part of everyday life** **•class list**
	2. Dimensions of Probability: a. combinations and permutations b. variables c. sampling d. distributions e. prediction	7/ review examples from various sources of data •class discussion	8/ develop examples of combinations and permutations and/or distributions •(visual and written)
	3. Dimensions of Statistics: a. reliability b. validity c. normal and skewed curves d. measures of central tendency e. theory and practice	13/ review examples of the use of mean, median, and mode •worksheets	14 / interpret data presented through newspaper articles that use measures of central tendency •(written/visual)
	4. Issues/Problems: a. chance vs. relationship (I) b. levels of confidence (I) c. systematic bias (P) d. decision-making (P) e. power (P)	19/ listen to professionals describe ways in which levels of confidence are utilized in business •notes	**20/ identify ways in which establishing levels of confidence impacts on the safety of people** **•list**
	5. Theme: Order a. may be natural or constructed b. may allow for prediction c. may communicate concepts d. may have repeated patterns e. may have elements of chaos	25/ review the generalizations and discuss their applications to probability and statistics •discussion	26/ examine situations in which the "order" in data communicates a concept •discussion
	6. Independent Study a. option #1: b. option #2: c. option #3: d. self-selected: small group e. self-selected: individual	31/	32/

→ ABSTRACT			
Use	Creative	Critical	Problem Solving
3/ develop a personal resource guide with information about the use of probability •guidebook	4/ add rules to an unfair game that would make it statistically fair •rulebook or checklist	5/ use criteria to determine whether or not the rules of a game are "fair" •matrix	6/ mess-finding: collect examples of case studies that made predictions •notes and discussion
9/ collect data via a sampling procedure and chart information showing distribution •chart or graph	10/ think of many ways to use skills of prediction in everyday life •written list	11/ affirm or dispute the assertion that data were collected fairly in a census poll •debate or editorial	12/ data-finding: distinguish successful from unsuccessful studies that made predictions •narrative
15/ develop a word problem for other students that requires interpretations •(written)	16/ think of unique ways to present narrative information through graphic representations •self-selected	17/ assess and interpret the data that are presented by a classmate •matrix	18/ problem-finding: identify the major impediments to making accurate predictions •list & narrative
21/ interview a meteorologist, a pollster, or a politician's aid regarding prediction •notes	22/ generate unique ways for using prediction to influence the decision-making process •self-selected	23/ affirm or dispute the political practice of surveying constituents and casting votes based on data •debate & editorial	24/ idea-finding: brainstorm ways in which a researcher might assure accuracy of prediction •list and web
27/ collect examples of situations in which ordered data have allowed for prediction •collection	28/ speculate on ways in which random occurrences might be used to form new concepts of order •(verbal or visual)	29/ establish and use criteria to distinguish between examples of "natural" and "constructed" order •(visual)	30/ solution-finding: use criteria to select guidelines for making orderly predictions •guidelines
33/	34/	35/	36/ acceptance finding: develop a plan of action for presenting guidelines to other students •outline or web

cross-referenced with *T.E.A. Essential Elements* (1988), pp. 149-150

LESSON PLAN #2

DIMENSIONS OF CURRICULUM:

Content: probability
Product: class list
Process: understand
Research: collect data: observation

LEARNING OBJECTIVE:

In their study of probability, students will be able to use what they have learned to identify ways in which "prediction" is used in everyday life and record their examples on a class list.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review the definition and the characteristics of prediction;
2. remind students they will be working on the comprehension level of thinking;
3. ask students to specify ways in which prediction is a part of everyday life and write their responses on the board;
4. assign students to seek additional examples of ways in which prediction is used in everyday life and add their observations to the class list during the week;
5. ask students to classify events or occurrences that can and cannot be predicted;
6. discuss with students the generalizations about the examples;
7. review the list with the class at the end of the week and assist students in understanding why the examples in the list are or are not valid.

MATERIALS: textbook, calculators, worksheets

ENVIRONMENT: regular classroom

PRINCIPLES OF DIFFERENTIATION: no differentiation intended

LESSON PLAN #12

DIMENSIONS OF CURRICULUM:

Content: dimensions of probability
Product: narrative
Process: problem solving: data-finding
Research: collect data

LEARNING OBJECTIVE:

In their study of probability, the students will be able to use what they have learned to distinguish successful from unsuccessful studies that made predictions. Students will present their findings in a narrative format.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. provide sample case studies in which either correct and incorrect predictions were made in various areas, including economics, elections, government, and meteorology;

2. discuss the nature of a case study approach, giving key procedures for collecting, synthesizing, and presenting data;

3. review skills of data-finding, including ways to use key descriptor words in order to prompt questions and categorize data;

4. assist students in determining traits that distinguish successful from unsuccessful case studies that have made predictions;

5. review product forms and criteria that will be used to critique and grade the assignment;

6. provide students with a time line for the assignment and continue to give assistance as needed;

7. collect and assess the products of the students and provide feedback.

MATERIALS: resource materials in the school and public library

ENVIRONMENT: regular classroom, libraries, and the community

PRINCIPLES OF DIFFERENTIATION: develop research skills and methods; develop productive, complex, abstract, and/or higher-order thinking skills

LESSON PLAN #20

DIMENSIONS OF CURRICULUM:

Content: issues and problems
Product: list
Process: understand
Research: collect data

LEARNING OBJECTIVE:

In their study of issues and problems relating to probability, students will be able to collect information regarding ways in which establishing levels of confidence influences people's safety. Students will present their findings in a list.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review information on methods used to establish levels of confidence;
2. define issues relating to the establishment of levels of confidence in areas of concern (including transportation, clothing, environment, food products, and working conditions);
3. have students examine areas in which confidence levels have been used to define "safe" situations or products;
4. review methods of collecting, recording, and analyzing data;
5. review key aspects of developing an accurate, attractive, and informative list;
6. give students the criteria by which their reports will be assessed;
7. provide students with a time line for completing the final product and continue to assist students as needed;
8. review products and provide students with comments.

MATERIALS: primary and secondary reference sources

ENVIRONMENT: regular classroom and learning center

PRINCIPLES OF DIFFERENTIATION: present content that is related to issues, problems, or themes; develop research skills and methods

LESSON PLAN #29

DIMENSIONS OF CURRICULUM:

Content: theme of order
Product: visual
Process: critical thinking
Research: review data

LEARNING OBJECTIVE:

In their study of the theme of order, students will be able to use what they have learned to establish and use criteria to distinguish between "natural" and "constructed" forms of order and will present their ideas in a visual product form.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the meaning of the generalization, *order may be natural or constructed*;
2. assist students in classifying given examples of "natural" order and "constructed" order in literature, mathematics, science, and social studies and in identifying key similarities and differences;
3. remind students that they are expected to use skills of critical thinking to establish and use criteria in order to make judgments based on evidence;
4. direct students to develop their own criteria for distinguishing between natural and constructed order and to apply the criteria to a set of phenomena;
5. review with students the means that will be used to assess their visual products;
6. provide students with a deadline for completing the assignment;
7. collect assignments, assess products, and return them to students with comments.

MATERIALS: resources in various disciplines, including language arts, mathematics, science, social studies, and the visual arts

ENVIRONMENT: multidisciplinary seminar or through a learning center

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, or themes; integrate multiple disciplines into an area of study; focus on open-ended tasks; encourage the development of products that challenge existing ideas and produce new ideas

Notes:

UNIT 3

Physics I

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Physics	BASIC →	
	Recall	**Understand**
1. Mechanics: a. force b. motion c. mass d. energy e. friction f. gravity g. weight h. pressure i. matter j. heat	1/ read textbook; listen to lectures; observe laboratory experiments •notes & quiz	2/ prepare for conducting laboratory experiments •worksheets
2. Laws: a. law of inertia b. law of constant acceleration c. law of conservation of momentum d. law of conservation of energy e. law of relativity	7/ read textbook; watch films and filmstrips; observe demonstrations •log & exams	8/ review law and its applications in a lab study group; conduct experiments •discussion & notes
3. Energy and Work: a. kinds b. characteristics c. influences d. power e. machines	13/ list kinds, characteristics, and sources of energy •notes	14/ examine ways in which forms of energy may be converted into other forms of energy •lab notes
4. Issues/Problems: a. renewable vs. nonrenewable (I) b. effectiveness vs. efficiency (I) c. safety vs. cost (I) d. economics (P) e. pollution (P)	19/ read textbook and articles on renewable and nonrenewable sources of energy •outline	20/ collect additional data from newspapers and magazines on sources of energy •collection
5. Theme: Order a. may be natural or constructed b. may allow for prediction c. may communicate concepts d. may have repeated patterns e. may have elements of chaos	25/ review the meanings of the generalizations relating to order •discussion	26/ examine the applicability of the generalizations to the study of physics •discussion & chart
6. Independent Study a. option #1: b. option #2: c. option #3: d. self-selected: small group e. self-selected: individual	31/	32/

SIMPLE ↓ COMPLEX

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→ ABSTRACT			
Use	**Creative**	**Critical**	**Problem Solving**
3/ conduct laboratory experiments and record findings in notebook •charts and narrative	4/ design plans for a unique "perpetual motion machine" using the mechanics of physics •model and narrative	5/ set and use criteria to judge the efficacy of perpetual motion machines developed •matrix & critique	6/ mess-finding: list the positive and negative influences of one of the mechanics •outline
9/ identify examples of laws of physics influence everyday life in school •list & illustrations	**10/ speculate on what would happen if one of the laws were not true all of the time** **•scenario**	11/ verify or dispute with evidence that gravity is a property of space, not of physical objects •self-selected	12/ data-finding: collect data about a scientist who challenged an existing law of physics •note cards
15/ identify and classify forms of energy that are used in the community •list and map	16/ generate many ideas for conserving energy in the community •self-selected	17/ judge with criteria the ideas generated for conserving energy •matrix	18/ problem-finding: specify the major obstacles in having a new idea accepted •discussion
21/ interview experts on renewable and nonrenewable sources of energy •log and tape	22/ speculate on ways in which the depletion of nonrenewable energy sources may effect the U.S.A. •self-selected	23/ affirm or dispute the need to develop and use nuclear fusion or fission •debate and editorial	24/ idea-finding: brainstorm many ways for using theories to solve an energy problem •chart/proposal
27/ role-play the figures of Aristotle, Galileo, Newton, or Einstein discussing natural order **•dramatization**	28/ speculate on ways natural order might be used to construct new forms of order •(written or visual)	**29/ verify or dispute that "chaos" plays a part in the order of physics** **•self-selected**	30/ solution-finding: use criteria to judge and select options generated in #24 •matrix
33/	34/	35/	36/ acceptance-finding: develop a plan of action for using physics in a career •self-selected

cross-referenced with *T.E.A. Essential Elements* (1988), pages 158-159

LESSON PLAN #8

DIMENSIONS OF CURRICULUM:

Content: laws of physics
Product: discussion and notes
Process: understand
Research: conduct experiment

LEARNING OBJECTIVE:

In their study of the laws of physics, students will work in study groups to review a law and then conduct a laboratory experiment. Students will discuss their observations and record their findings on note cards.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. explain to the students that in their groups, they will review a specific law of physics and then conduct a laboratory experiment related to that law;
2. refer the students to the resources available to them in reviewing the specific law while working in groups;
3. remind the students that they will be using the comprehension level of thinking, showing that they understand the information that was presented in previous lessons;
4. review laboratory techniques and rules to be followed in conducting the experiment;
5. specify the types of information that students should include on their note cards;
6. indicate the criteria that will be used in assessing the work of the groups;
7. assist students, as needed, as they work in their groups;
8. collect note cards, critique them, and return the cards to the students with comments.

MATERIALS: resource materials, laboratory materials, note cards

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: no differentiation intended

LESSON PLAN #10

DIMENSIONS OF CURRICULUM:

Content: laws of physics
Process: creative thinking
Product: scenario
Research: hypothesize

LEARNING OBJECTIVE

In their study of the laws of physics, students will be able to use what they have learned to speculate on what might happen if one of the laws were not true all of the time. The students will hypothesize about the possible consequences and present their ideas in a scenario.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review the basic tenets of the laws of physics previously studied by the students;
2. explain to the students that they will use creative thinking skills to speculate on the possible consequences of one of the laws not being true all of the time;
3. review the ways that scientists develop hypotheses;
4. indicate that students will present their ideas through a written scenario and review the key factors of that product form;
5. specify the criteria that will be used in assessing the products;
6. assist students, as needed, as they develop their written scenarios;
7. provide time for students to share their ideas in class;
8. collect and critique the papers and then return them to students with comments.

MATERIALS: textbooks and reference books

ENVIRONMENT: regular classroom and homework assignment

PRINCIPLES OF DIFFERENTIATION: focus on open-ended tasks; develop productive, complex, abstract, and/or higher-order thinking skills

LESSON PLAN #27

DIMENSIONS OF CURRICULUM:

Content: theme of order
Process: use
Product: dramatization & checklist
Research: review data

LEARNING OBJECTIVE:

In their study of the theme of order, students will use what they have learned to portray the perceptions of Aristotle, Galileo, Newton, and Einstein regarding natural order and will present these scientific points of view through a dramatization that will be critiqued by other students.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. assist students in reviewing the theories of natural order held by Aristotle, Galileo, Newton, and Einstein;

2. remind students that the information will be used in a dramatization and that the students playing the roles will be expected to convey the perceptions of the scientists with clarity and accuracy;

3. review the key aspects of a role-playing dramatization and present the criteria that will be used in assessing the students' performances;

4. invite students to volunteer for the roles and to participate in the dramatization;

5. assist students, as needed, in preparing for and participating in the activity;

6. explain to the students who will view the dramatization the procedure that they will follow to assess the performance using a checklist;

7. schedule time for the students to perform and view the dramatization and to discuss the outcome.

MATERIALS: primary and secondary sources

ENVIRONMENT: regular classroom and learning centers

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issue, problems, or themes; evaluate student outcomes by using appropriate and specific criteria through self-appraisal, criterion-referenced and/or standardized instruments

LESSON PLAN #29

DIMENSIONS OF CURRICULUM:

Content: theme of order
Product: self-selected
Process: critical thinking
Research: collect and analyze data

LEARNING OBJECTIVE:

In their study of the theme of order, students will be able to use what they have learned to verify or dispute that "chaos" influences the order of physics and will present their conclusions in a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. present ideas from theories relating to the "new physics" and chaos theory;
2. remind students that they are expected to use skills of critical thinking to make judgments based on the application of criteria and the collection of data;
3. review the scientific method with students;
4. assist students in formulating hypotheses, collecting data, making judgments, and stating conclusions;
5. review with students the product forms that could be used in presenting their conclusions on chaos and order in physics;
6. present the criteria that will be used in assessing student products;
7. assist students, as needed, in developing and presenting their products and conclusions;
8. provide time for students to present their conclusions in class;
9. give students feedback on their work.

MATERIALS: primary and secondary documents

ENVIRONMENT: regular classroom and homework

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, or themes; develop research skills and methods; encourage the development of products that challenge existing ideas and produce new ones.

Notes:

UNIT 4

American Cultural Studies

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SIMPLE ↓ COMPLEX

American Cultural Studies:	BASIC → Recall	Understand
1. Contributing groups: a. cultural groups b. ethnic groups c. national groups d. racial groups e. religious groups	1/ read selections; watch films; listen to speakers •notes & discussion	2/ identify traits that are unique to each group and common to all groups •chart
2. Dimensions of culture: a. arts: visual and performing b. governance c. literature (oral and written) d. mythology and tradition e. technology	7/ observe dramatic performances of cultural myths •notes & discussion	8/ understand the reasons for emigration and groups' contributions to their new homeland •discussion
3. Dynamic of interactions: a. accommodating b. assimilating c. contributing d. influencing e. resisting	13/ trace the historical origin and the movements of the selected groups •time line	14/ examine the interactions and the influences of the groups through time •report
4. Issues/Problems: a. minority vs. majority cultures (I) b. recognition vs. exploitation (I) c. rights vs. responsibilities (I) d. identity (personal & cultural) (P) e. equity and access (P)	19/ recognize ways to maintain a cultural identity and also participate in other cultures •discussion	20/ explain specific group celebrations (origins, meanings, and rituals) •self-selected
5. Theme: Order a. may be natural or constructed b. may allow for prediction c. may communicate concepts d. may have repeated patterns e. may have elements of chaos	25/ review selected contributions of the groups in terms of social order •discussion	26/ examine types of "order" represented in the forms of contributions •chart w/ narrative
6. Independent Study a. option #1: b. option #2: c. option #3: d. self-selected: small group e. self-selected: individual	31/ 202	32/

Use	Creative	Critical	Problem Solving
3/ interview members of groups who have made personal contributions to culture •tape	4/ speculate on what might have happened if a specific contribution had not been made •scenario	5/ using specific criteria, determine which contribution has had the greatest personal impact •matrix	6/ mess-finding: identify positive and negative aspects of having a "unique" idea within a group •list
9/ depict the impact of a contribution on aspects of everyday life •poster	10/ generate ideas as to how contributions from groups could be combined to form new contributions •self-selected	11/ distinguish ways in which a society may encourage or discourage groups' contributions •chart & discussion	12/ data-finding: collect data on an individual who made an important, unique contribution •note cards or outline
15/ share information about a contribution that has been made by a self-selected group •(oral or written)	16/ generate many and unique ways for groups to celebrate their contributions •(verbal or written)	17/ distinguish between helpful and harmful ways groups may interact •chart w/ narrative	18/ problem-finding: identify the sources of harmony and conflict in pluralistic societies •self-selected
21/ interview members of contributing groups and note key factors of "identity" •report	22/ elaborate on ways in which equality and access might be fairly balanced •speech or story	23/ judge with criteria the rights and the responsibilities of an individual in a given situation •discussion	24/ idea-finding: think of many unique ways for a country to encourage diversity in unity •(visual or written)
27/ develop a dramatization that presents examples of order in contributions •presentation	28/ think of unique ways that a new order might enhance the contributions of groups •(verbal or visual)	29/ verify or dispute the assertion that order may have elements of chaos •self-selected	30/ solution-finding: judge with criteria the ideas generated in cell #24 •matrix
33/	34/	35/	36/ acceptance-finding: develop a plan of action to implement ideas from the unit •self-selected

cross-referenced with *T.E.A. Essential Elements* (1988), p. 198

LESSON PLAN #8

DIMENSIONS OF CURRICULUM:

Content: dimensions of culture
Product: discussion
Process: understand
Research: collect data: primary & secondary

LEARNING OBJECTIVE:

In their study of dimensions of culture, students will use primary and secondary sources to collect information about the reasons why immigrant groups left their homeland and what contributions they made to their new homeland. Students will present their findings in a class discussion.

DESCRIPTION OF ACTIVITY: **The teacher will:**

1. assist students in reading information regarding the reasons various groups emigrated from their homelands;

2. remind students that they are to examine the reasons for emigration and explain this information in their own words;

3. specify the areas of contribution that all groups bring with them: the arts, means of governance, literature, mythology, traditions, and technology;

4. explain to students the criteria that will be used to assess their final products;

5. assist students working in small groups to pursue study regarding specific immigrant groups and their contributions;

6. ask student representatives from the small groups to present their findings to the other members of the class;

7. give students feedback about their work.

MATERIALS: primary and secondary resources

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: no differentiation intended

LESSON PLAN #10

DIMENSIONS OF CURRICULUM:

Content: dimensions of culture
Process: creative thinking
Product: self-selected
Research: review information

LEARNING OBJECTIVE:

In their study of dimensions of culture, students will be able to use what they have learned to generate ideas on how the contributions from groups could be combined to form new contributions. Students will present their ideas through a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with the students the contributions (that have been previously studied) of various groups in the areas of the arts, governance, literature, mythology, tradition, and forms of technology;

2. review the rules of brainstorming with the students and remind students that they will be using their skills of creative thinking to generate ideas;

3. present the criteria that will be used to assess the products of the students;

4. direct students to work in small groups in order to use skills of flexible thinking to combine, adapt, and synthesize known contributions in order to form new contributions;

5. walk among groups and encourage the use of creative thinking skills;

6. remind students that they may select the product form(s) that they will use to present their ideas to the other members of the class;

7. provide students with time to present ideas and receive critiques from other students.

MATERIALS: primary and secondary sources of information

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: develop productive, complex, and/or higher-level thinking skills; encourage the development of products that challenge existing ideas and produce new ones

LESSON PLAN #26

DIMENSIONS OF CURRICULUM:

Content: theme of order
Process: understand
Product: chart with narrative
Research collect and analyze data

LEARNING OBJECTIVE:

In their study of the theme of order, students will be able to use what they have learned to examine concepts that have been communicated through cultural contributions. The students will present their findings in a chart with a narrative.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review information regarding types of order (i.e., sequential and random; linear and spiral; western and eastern; hierarchical and horizontal) used to organize and communicate concepts;

2. discuss with students the possible reasons for a society to adopt and follow a particular form of order;

3. present information on theories of structure and order;

4. remind students that they will be using skills of comprehension in order to interpret existing data;

5. review with students the key aspects of the product form (chart with narrative);

6. present the criteria that will be used in assessing student products;

7. provide students with time and resources to complete the assignment;

8. give students feedback regarding their work.

MATERIALS: artifacts, publications, photographs, and other resources

ENVIRONMENT: learning center in the regular classroom

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, or themes; develop research skills and methods

LESSON PLAN #29

DIMENSIONS OF CURRICULUM:

Content: theme of order
Product: self-selected
Process: critical thinking skills
Research: review and analyze data

LEARNING OBJECTIVE:

In their study of the theme of order, students will use what they have learned to verify or dispute the assertion that order may include elements of chaos. Students will collect data from various fields and present their conclusions in a self-selected product.

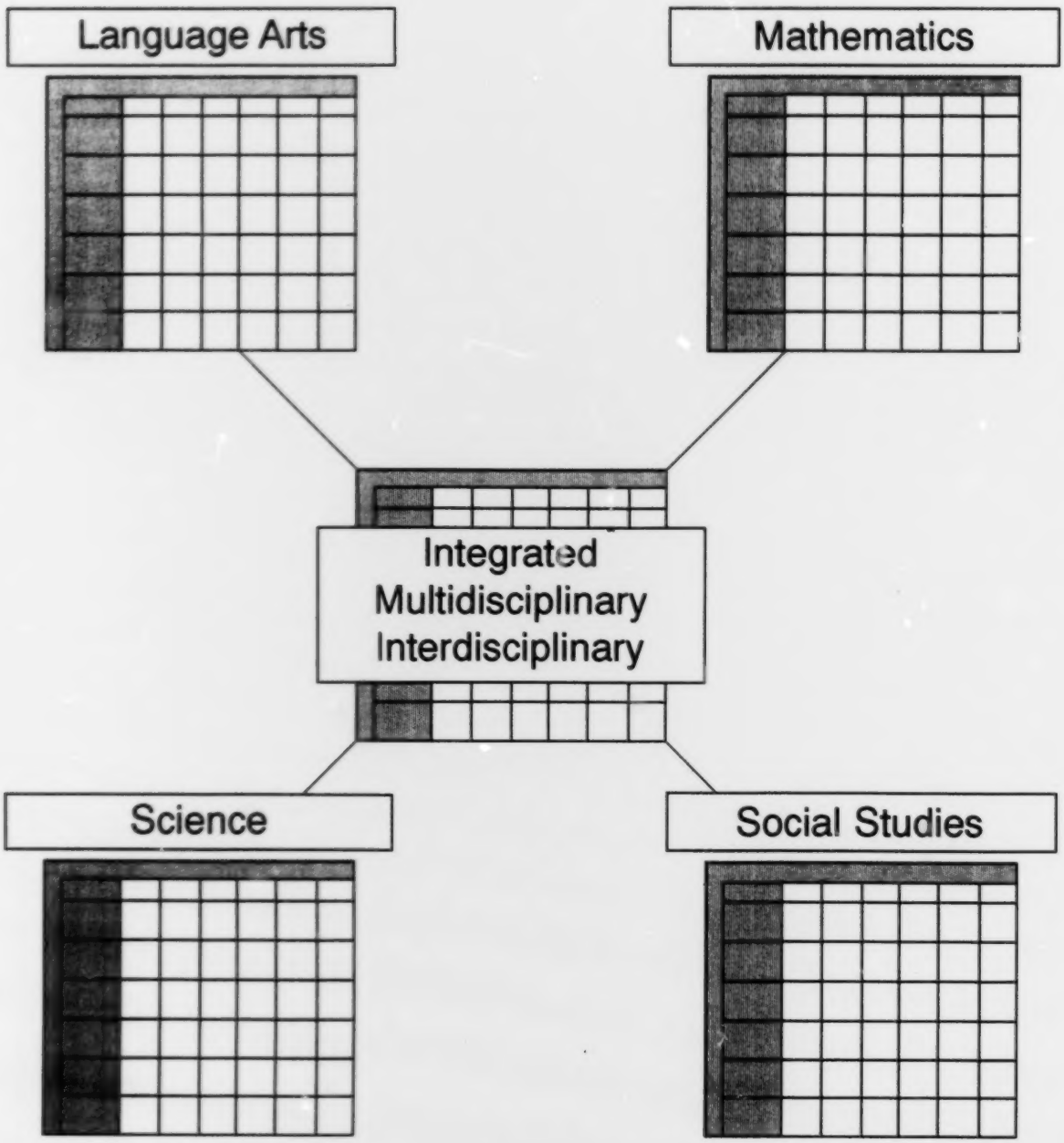
DESCRIPTION OF ACTIVITY **The teacher will:**

1. review the meaning of the generalization, *order may have elements of chaos*;
2. explain to the students that they will use (a) information collected through research and (b) skills of critical thinking to verify or dispute the generalization;
3. remind the students they may use data from the arts, literature, mathematics, science, and social studies to affirm or dispute the generalization;
4. review the product options and the product guidelines that have been presented in class and explain what criteria that will be used to assess student work;
5. provide students with a time line that specifies due dates;
6. assist students in presenting their conclusions to the class;
7. provide students with feedback regarding their product forms and their use of critical thinking skills.

MATERIALS: resource books in many disciplines

ENVIRONMENT: regular classroom, school library, and the community

PRINCIPLES OF DIFFERENTIATION: integrate multiple disciplines into an area of study; develop research skills and methods; develop productive, complex, abstract, and/or higher-level thinking skills


Language Arts
Mathematics
Integrated
Multidisciplinary
Interdisciplinary
Science
Social Studies

UNIT 5

A Study of Order: A Multidisciplinary Approach

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SIMPLE ▼ COMPLEX

Theme: Order (a multidisciplinary approach)	BASIC → Recall	Understand
1. Discipline perspectives: a. literature: American literature b. mathematics: statistics c. science: physics d. social studies: American culture e. (other)	1/ review key disciplinary perspectives on the theme of order •discussion & notes	2/ explain ways in which the disciplines influence and are influenced by order •discussion & notes
2. Generalizations about order: a. may be natural or constructed b. may allow for prediction c. may communicate concepts d. may have repeated patterns e. may have elements of chaos	7/ review various meanings and applications of the generalizations •discussion & notes	8/ present evidence from each discipline that will verify or refute a generalization •written log
3. Issues relating to order: a. sequential vs. random b. linear vs. spiral c. western vs. eastern d. hierarchical vs. horizontal e. (other)	13/ review the basic issues relating to the concept and the study of "order" •discussion & notes	14/ summarize the issues as they apply to the disciplines and the topics of study •discussion & notes
4. Problems relating to order: a. balance b. equity c. continuity d. clarity e. (other)	19/ review the basic problems relating to the concept and the study of "order" •worksheet	20/ describe how professionals within disciplines have responded to the problems •report
5. Sub-Themes: a. change b. force c. patterns d. structure e. systems	25/ examine structures and patterns of order within a self-selected area of study •report	26/ examine the change in order within a discipline over time •report
6. Independent Study a. option #1: b. option #2: c. option #3: d. self-selected: individual e. self-selected: small group	31/	32/

Use	Creative	Critical	
3/ develop a class display that shows order within each discipline •bulletin board	4/ think of many ways in which the "order" within one discipline might influence other disciplines •list or illustrations	5/ judge with criteria which discipline has had the greatest impact on "order" in everyday life •matrix and narrative	6/ mess-finding: determine the positive and negative aspects of order within a discipline •notes
9/ find newspaper articles and ads that relate to the selected generalizations •collection	10/ elaborate on ways in which knowing the "big ideas" may be helpful in academic study •list	11/ verify or dispute the applicability of one generalization to an area of personal interest •self-selected	12/ data-finding: collect data on the origin of order within a discipline •notes
15/ interview professionals who use order to organize and to present new ideas •notes & interviews	16/ think of a new, unique way to provide order within a self-selected area •report & illustration	17/ compare and contrast means of ordering data in terms of disadvantages and advantages •self-selected	18/problem-finding: determine, in the broadest sense, the key to establishing an order •self-selected
21/ identify structures that "resolve" a problem relating to order •report	22/ speculate on ways to solve a problem relating to order •self-selected	23/ judge the ideas generated in square #22 using established criteria •matrix	24/ idea-finding: brainstorm a list of ways for modifying order within one discipline •list
27/ find examples of ways in which "force" influences order •self-selected	28 generate a list of "big ideas" for one of the sub-themes •list	29/ use established criteria to determine whether the "big ideas" qualify as generalizations •matrix & discussion	30/ solution-finding: set and use criteria to judge the ideas generated in cell #24 •matrix
33/	34/	35/	36/ acceptance-finding: develop a plan of action to change order in a self-selected area •plan

LESSON PLAN #8

DIMENSIONS OF CURRICULUM:

Content: theme of order
Process: understand
Product: written log
Research: collect data

LEARNING OBJECTIVE

In their study of the theme of order, students will use data from literature, mathematics, science, and social studies to discuss evidence that verifies or refutes one of the theme's generalizations. Students will present their findings though a written log.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with the students the generalizations for the theme of order;
2. provide students with examples from various disciplines that verify or dispute one of the generalizations;
3. remind students that they are being asked to operate on the comprehension level of thinking by demonstrating that they understand the generalizations;
4. ask students to select the generalization that they wish to use in the assignment and have students form groups according to their choices;
5. tell students that they will record their findings in a written log and remind students of the key aspects of the product form;
6. present criteria that will be used in assessing student products;
7. provide time for students to work in groups on the assignment;
8. collect and review student work and provide feedback.

MATERIALS: resource books from literature, mathematics, science, and social studies

ENVIRONMENT: regular classroom in discussion groups

PRINCIPLES OF DIFFERENTIATION: integrate multiple disciplines into an area of study; develop research skills and methods

LESSON PLAN #17

DIMENSIONS OF CURRICULUM:

Content: issues and problems
Process: critical thinking
Product: self-selected & presentation
Research: collect data

LEARNING OBJECTIVE

In their study of order, students will be able to use what they have learned to compare and contrast advantages and disadvantages in means of ordering data and will present their conclusions in a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the types and functions of order within a discipline;
2. review common means of ordering information and concepts within a discipline (sequential vs. random, linear vs. spiral, western vs. eastern, hierarchical vs. hortizontal);
3. remind students that they will be using critical-thinking skills in order to make judgments based on criteria and evidence;
4. explain that students may use any of the product forms that have been discussed in class and refer students to the product descriptors for use in completing the assignment;
5. provide students with time, resources, and assistance to work on the assignment;
6. schedule time for students to present their conclusions to other members of the class and encourage students to offer their comments to the presenter;
7. provide each student with comments regarding his/her product and presentation.

MATERIALS: multiple resource books

ENVIRONMENT: regular classroom

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, or themes; develop productive, complex, abstract, and/or higher-level thinking skills; encourage the development of products that challenge existing ideas and produce new ideas

LESSON PLAN #25

DIMENSIONS OF CURRICULUM:

Content: sub-theme of change
Process: understand
Product: report
Research: collect data

LEARNING OBJECTIVE

In their study of order, students will be able to use what they have learned to examine the change in order over time in an area of study and will present their findings in a report.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the generalizations about the theme of order and the generalizations about the sub-theme of change;

2. remind students they are being asked to think on the comprehension level of thinking, demonstrating that they understand the relationship of change to the study of order;

3. explain that the product for the assignment is a report, which may be presented in a kinesthetic, verbal, visual, /or written format;

4. refer students to the product descriptors that may be used in constructing individual reports;

5. provide students with time, resources, and assistance as they work on the assignment;

6. schedule time for students to present their findings to other members of the class;

7. give students comments about their reports.

MATERIALS: resource publications

ENVIRONMENT: regular classroom, school library, learning centers

PRINCIPLES OF DIFFERENTIATION: integrate multiple areas into an area of study; develop research skills and methods; develop productive, complex, abstract, and/or higher-level thinking skills

LESSON PLAN #28

DIMENSIONS OF CURRICULUM:

Content: sub-themes for order
Product: list
Process: creative thinking
Research: collect and utilize data

LEARNING OBJECTIVE

In their study of order, students will be able to use what they have learned to select a sub-theme, develop generalizations for the sub-theme, and present their ideas through a list.

DESCRIPTION OF ACTIVITY **The teacher will:**

1. review with students the definition of a generalization and refer to the generalizations for the theme of order;

2. explain to students that they will select a sub-theme (i.e., change, force, patterns, structure, or systems) of order and work in a group to brainstorm generalizations;

3. review the rules of brainstorming with the students, including ways to respond to individuals who forget the rules;

4. assign students to work in small groups (according to the sub-theme selected) and to determine the roles that the members of the group will assume;

5. provide students with time and resources to generate many "big ideas" for the sub-theme selected;

6. ask each group to select a spokesperson to present the list of generalizations developed through brainstorming;

7. provide students with feedback regarding their small group work.

MATERIALS: resource materials

ENVIRONMENT: regular classroom and small group work

PRINCIPLES OF DIFFERENTIATION: present content that is related to broad-based issues, problems, and themes; develop productive, complex, abstract, and/or higher-level thinking skills; encourage the development of products that challenge existing ideas and produce new ideas

Notes:

UNIT 6

A Practice Unit of Study

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SIMPLE → COMPLEX	TITLE	BASIC →	
		Recall	Understand
	1. Essential Element: a. b. c. d. e.	1/	2/
	2. Essential Element: a. b. c. d. e.	7/	8/
	3. Essential Element: a. b. c. d. e.	13/	14/
	4. Issues and Problems: a. b. c. d. e.	19/	20/
	5. Theme: a. b. c. d. e.	25/	26/
	6. Independent Study a. option #1: b. option #2: c. option #3: d. self-selcted: individual e. self-selected: small group	31/	32/

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Use	Creative	Critical	Prod
3/	4/	5/	6/
9/	10/	11/	12/
15/	16/	17/	18/
21/	22/	23/	24/
27/	28/	29/	30/
33/	34/	35/	36/

LESSON PLAN #___

DIMENSIONS OF CURRICULUM:

Content: **Process**:
Product: **Research**:

LEARNING OBJECTIVE

In their study of _____, students will be able to use what they have learned to_____ and will present their findings in a _____ _____, a _____, or a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1.

2.

3.

4.

5.

6.

7.

MATERIALS:

ENVIRONMENT:

PRINCIPLES OF DIFFERENTIATION:

LESSON PLAN #___

DIMENSIONS OF CURRICULUM:

Content: **Process**:
Product: **Research**:

LEARNING OBJECTIVE

In their study of _____, students will be able to use what they have learned to_____ and will present their findings in a _____ _____, a _____, or a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

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2.

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4.

5.

6.

7.

MATERIALS:

ENVIRONMENT:

PRINCIPLES OF DIFFERENTIATION:

LESSON PLAN #___

DIMENSIONS OF CURRICULUM:

Content: **Process**:
Product: **Research**:

LEARNING OBJECTIVE

In their study of _____, students will be able to use what they have learned to_____ and will present their findings in a _____ _____, a _____, or a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1.

2.

3.

4.

5.

6.

7.

MATERIALS:

ENVIRONMENT:

PRINCIPLES OF DIFFERENTIATION:

LESSON PLAN #___

DIMENSIONS OF CURRICULUM:

Content: **Process**:
Product: **Research**:

LEARNING OBJECTIVE

In their study of _____, students will be able to use what they have learned to_____ and will present their findings in a _____ _____, a _____, or a self-selected product.

DESCRIPTION OF ACTIVITY **The teacher will:**

1.

2.

3.

4.

5.

6.

7.

MATERIALS:

ENVIRONMENT:

PRINCIPLES OF DIFFERENTIATION:

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Notes:

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